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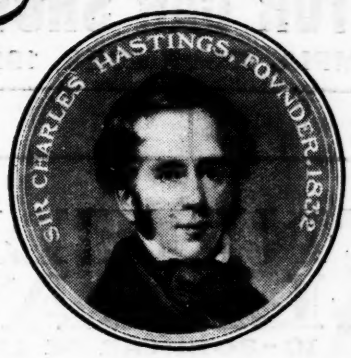

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DISCUSSION ON ANAESTHETICS AND ANALGESICS IN LABOUR.

OPENING PAPERS.

I.—W. OSBORNE GREENWOOD, M.D., B.S., F.R.S.EDIN., Harrogate.

IT is only within the last few years that we have come to realize that labour, in 95 per cent. of cases, is not the normal physiological process of which our immediate forebears so glibly talked, but is one of the desperate fears and grey spots in the modern woman's life. It is only a humane platitude to say the sufferings in labour have as much claim upon our skill and sympathies as those of any disease. If, therefore, by our obstetric art we can "life's leaden metal into gold transmute," no further apology is needed. It may be objected that this is largely a sentimental view, but when we have come to the conclusion of the whole matter we shall see there are very decided and practical advantages on the physical and physiological sides. For upon our estimate and appreciation of the influence of pain and fear in parturition will depend our attitude towards the need for anaesthetics and analgesics in labour. In spite of Hilton's classic, *Rest and Pain*, little progress was made until recent years in our estimate of the real part pain plays in the pathology of our chief organs, even to the point of the *exitus lethalis*. But the work of Crile and a host of others has taught us how profound the effects of pain and fear may be upon such master tissues as brain, liver, and suprarenals, not to mention secondary effects on other organs. And we may attempt to dismiss them as we will, the fear and pain of labour are daily having their baneful effects on vital organs, and a studied indifference is not a specific against what may prove eventually to be permanent lesions in cerebral or suprarenal cortical cells. But the very choice of to-day's subject may be taken to show that we are convened to discuss seriously the real merits of some means of alleviating travail provided they are safe.

Without further preamble it may be said that the practical methods which hold the field at present are ether, chloroform, nitrous oxide, and scopolamine-morphine. Not that these represent the final word in the immediate future, but other methods already tried tentatively have not attained the certainty or the practicability of the above. I wish to state at the outset that it is my intention to regard the question of anaesthetics and analgesics largely from the viewpoint of shock, and this will explain what I say later. If chloroform or ether or nitrous oxide be administered at the end of a labour solely for the purpose of carrying out some operative procedure, such as extraction with forceps or a cephalic perforation, we cannot in any sense regard the anaesthetic as an essential part of the treatment—it is, so to speak, an accidental accessory. Such a use as this has its time-honoured place in labour. But it may be taken this discussion has a far larger end in view. Shock and exhaustion are in no degree whatever prevented by this accidental use, and we are here to determine as far as we can how the dangers of shock may best be averted by making anaesthesia or analgesia, or some modification of them, an essential part of the conduct of labour.

The recent work on shock and exhaustion has radically altered our conception of the part these two play. But though the limits of this paper forbid me examining these thoroughly it may be stated as well proven that the injury to cerebral, suprarenal, and hepatic cells is not only serious but often irreparable and fatal. Acidosis, oedema, rupture of the membrane, and disintegration of the nucleus form the chain of changes in cells of the most vital organs. And while one would not be so foolish as to say this complete chain is common in labour, yet who can tell how many of the ill-defined ailments in a woman's middle life, for which no gross lesions can be discovered to account, are due to the destruction of a limited number of cells consequent upon labour? I think this is more probable than has so far been conceded. And when we reflect that the causes of shock are trauma and pain, emotion, especially fear, exertion, insomnia, haemorrhage, the infections and injection of acids, and that all these save the last two are operative, sometimes markedly so, in labour, it is evident we need a more systematic shielding during parturition if we are to give the pregnant woman not only the benefit of our knowledge and skill but an assurance that these are hers for the asking. The fear of labour harboured by women has been scoffed at and scouted, but after insisting for many years on its reality and importance it is gratifying to find such confirmation in Crile as this:

"Emotion causes a more rapid exhaustion than is caused by exertion, or by trauma, except extensive mangling of tissue, or by any toxic stimulus except the perforation of viscera" (p. 60).

And again:

"Fear caused profound changes in the cells of the brain, the liver, and the adrenals" (p. 63).

It must now be clear enough that, especially in the longer and severer labours, there is need for some protection of these vital tissues, and we are prepared for a comparison of the claims of the most suitable methods of attaining this. Of the general anaesthetics nitrous oxide is the best in the sense that it comes nearest to the ideal of a shockless operation. After prolonged administration the serious changes in the cells above enumerated are scarcely to be found, sometimes not at all; but against anything approaching its universal use are the grave disabilities of an almost prohibitively cumbrous apparatus, the cost, and a virtually continuous administration, maybe for many hours. I doubt whether any maternity hospital could bear the financial drain of using it for all cases, and certainly the vast army of the middle class could not. And while the actual cost of chloroform or ether is not prohibitive the other objections are very serious. If given *à la reine* a very skilled anaesthetist would usually be needed many hours, to requite whose services would naturally be very costly. The labour would be very greatly retarded, while *post-partum* haemorrhage is certainly more common and severe. Most serious of all, so far from preventing or even reducing shock, chloroform and ether are actually prone to initiate and continue those cell changes of acidosis, oedema, and even disintegration, which we are seeking to avert. Again quoting Crile:

"Prolonged inhalation anaesthesia caused acute blood acidosis and the usual histological changes in brain, liver and suprarenals" (p. 73).

And also:

"The human mechanism in shock or exhaustion is not restored by physical injury, nor by strychnine, alcohol, anaesthetics, camphor oil, anxiety, painful examinations, rough handling, but by rest and sleep" (p. 185).

While, therefore, on the one hand, chloroform and ether, given at the end of a labour for some operative interference, do not supply the protection from shock which we seek, on the other hand, given *à la reine* for many hours, they actually intensify the ills. In addition to which, this latter method is infinitely more exacting to the attendant than the remaining method we are to consider. In fine, a prolonged general anaesthesia is now known to fulfil none of the demands of a "shockless operation." The ideal technique of this is not applicable to labour, since cocaine and its congeners are useless and the spinal method is little better. Crile's work abounds in quotations representing his own experiments and those of many others showing the remarkable results of the shockless operation methods, but very few must suffice.

"No amount of burning, cutting or crushing caused any notable change in the circulation or respiration provided the central nervous system had been previously disconnected from the injured area by the blocking of the nerve supply with a local anaesthetic" (p. 25). "Nerve trunks may be physiologically blocked by a local anaesthetic so that neither afferent nor efferent impulses of any kind can pass, hence no injury of an area thus protected can cause even the slightest degree of shock" (p. 34). "Of great significance is the fact that the brain

cells showed no change when the trauma was limited to the territories disconnected from the brain by severing the spinal cord or by local anaesthetization" (p. 41).

Now although scopolamine-morphine (or scop-omnopon) cannot be regarded as a local anaesthetic in the sense that cocaine is, my thesis is, it is sufficiently so in a far larger sense—namely, by cutting off the cerebral cortical cells from the remainder of the body—as to be the ideal method for use in labour, exactly as cocaine is for the performance, say, of a radical cure of hernia. We must remember that the traumatic area in labour is a very wide one, including not only a vastly enlarged uterus and its appendages, but pressure effects on bladder, large intestine, and perineum—the nerve supplies of which are from very diverse sources.

Crile has pointed out that insomnia produces shock, and the results on brain and other tissue cells are the same as trauma, only more gradual. Sleep is the great preventive of and restorer from shock, and Crile says:

"There is a vast clinical experience as well as supporting histological evidence that morphine as a substitute for sleep accomplishes for the brain cells much of what is accomplished by sleep" (p. 50).

And again:

"The cells of the brain, liver and adrenals are more restored by opium than by any other agency excepting sleep. Nitrous oxide to some extent effects a like restoration but is not as potent as opium" (p. 54).

We are now on the threshold of my contentions respecting the use of omnopon-scopolamine in labour in preference to any of the other methods outlined. For although the obliteration of the great bulk of the labour is the thing which appeals most to the patient and which was so boomed in the lay press, to the scientific obstetrician it is far more valuable to realize it is a shockless surgical operation. Not only so, an absolutely correct technique, so far from carrying any menace to the infant, confers the same advantages on it as are enjoyed by the mother. And this effect on the mother is not surprising when we reflect that the great bulk of the time occupied by the labour is spent in apparently normal sleep. The consideration of outstanding importance is brain-rest, and if we secure this while the essential labour organs—that is, uterus and abdominal muscles—perform their functions perfectly, we have not only secured an ideal labour but have also attained a shockless operation. The general anaesthetics fall short of this high standard.

In the light of the recent work on shock the suggestions I put forward five years ago as to the way in which scopolamine-morphine probably acts have become invested with a new interest. As is well known a local anaesthetic cuts off the area under manipulation from the rest of the nervous system. Especially does it prevent the cerebral cortical cells and the receptive white matter receiving painful afferent impressions. My thesis then was, and is now, that omnopon-scopolamine causes the retraction of the dendrites of the cells, and it is therefore at these synapses where the block occurs, and hence there can be no diffusion of stimuli. This, I admit, may equally well occur at a subcortical centre, but probably not in the cord. We know that this shrinking of dendrites, and therefore imperfection of synapsis, is common in old age, and it is then that memory for recent events may be very imperfect or even absent, while the memory of past events is usually quite accurate. The interesting feature is that the amnesia of this semi-narcosis is an exact temporary induction of the forgetfulness of old age. Anent this, Crile's observation (p. 177) is peculiarly interesting:

"The synapse may be regarded as a highly adapted switch which now closes the circuit, now opens it; now diminishes the current, now accelerates it. This living switch or key may be the site of the activation of tetanus or strychnine convulsions. It may possibly determine sleep or the action of certain anaesthetics."

From this it would seem clear that in strychnine and tetanus poisoning there is no excitation of cerebral cells, but the synapses are closed and there is a continuous electrical discharge. This appears to be countenanced by the fact that complete consciousness is retained to the end. Sherrington's work also very strongly bears out this view. This theory accords perfectly with the fact that powerful stimuli applied during the sleep of the labour are afterwards remembered, for they jump the increased gap between the retracted dendrites just as an electric current of higher potential will spark across a wider gap than will one of lower potential.

The limitations of time compel us now to a brief survey of the correct technique to be observed in successfully inducing this semi-narcosis, the effects on the mother and those on the infant. As usual, every case is regarded as a major surgical operation and the ordinary aseptic precautions rigidly observed. And first, we must decide how early the treatment may be begun. In primiparae it is very important to be sure the labour has really set in and the os has made some progress in dilatation. A fairly safe average guide is to begin when the os is the size of a shilling. In any case regularity of the uterine contractions must be established. In multiparae, however, the first injection may be given as soon as several good contractions have demonstrated the onset of the labour. From the moment of this decision the judgement of the attendant must be continually on the alert if he is anxious to obtain the best results. Thus it may be stated that for the majority of patients the first dose should be omnopon 1/3 grain (or morphine 1/5 grain) with scopolamine 1/150 grain. But even here not enough attention has been paid to the variation of the initial dose according to the type of patient. A small, worn-out, phlegmatic woman would not need quite as much as this, while a large, athletic, vivacious type may easily need half a grain of omnopon and scopolamine 1/120 grain. Having received the first injection the patient is bidden to lie down, be calm, and go to sleep with the confident assurance that the labour will proceed well. This, of course, presupposes that a previous examination has shown it to be reasonably anticipated, that any malpresentation has been rectified or can be during the progress of labour, and that any disparity in the size of pelvis and foetal head has been met by a suitably timed premature induction, etc. In from an hour to an hour and a half the patient should be sleeping comfortably between the uterine contractions, which will rouse her at each onset. Judged by the amount of sleep the patient has had, and to some extent by the flushing of the face, the second dose may vary between 1/150 and 1/450 grain of scopolamine alone, usually not so small as the latter. About half an hour after the second injection the testing for amnesia is begun. The majority of patients have not responded enough until this time and the testing is therefore an act of supererogation. This testing is the only certain way of determining success or failure in spite of repeated asseverations to the contrary, and the borderline between the two is so narrow that its importance cannot be overrated. Success means that the patient has reached the stage of forgetfulness—no more, no less. And it must be regarded equally as failure if the patient does not reach the amnesic condition or if she is needlessly beyond it. To aim at analgesia is not only unnecessary but oversteps the safety line. In every ideal case there is probably some analgesia, for which it would be better to reserve the term "hypalgesia." To adopt this would emphasize the fact that any marked analgesia is unsafe. From this point onwards there may be the greatest diversity in the dosage, and the amounts of scopolamine are determined entirely by the amnesic state of the patient. So too are the intervals at which a repetition of scopolamine is necessary. It may be added that towards the end of the labour it is well to avoid if possible the administration of any dose too near the moment of expulsion of the infant.

The method of applying the test for amnesia which I use is as follows. Some object with which the patient is familiar is chosen: a convenient one being something from the infant's basket—a sponge, a comb—but any other, such as a key, or a penny, will do. The patient is gently roused, shown the object, and asked what it is. She will usually reply promptly, "A sponge." She is then allowed to fall asleep at once. About half an hour later she is again roused and asked, "What did I show you a little while ago?" If she promptly replies, "A sponge," she is not yet amnesic; if she appears to make an effort to remember and finally does so, she is on the verge of amnesia; but if fully amnesic she will say she does not know or will give some perfectly irrelevant reply, or perhaps do so by a counter-question. We have now attained the object in view, and as the testing proceeds during the progress of the labour a repetition of the scopolamine is needed if the patient appears to be on the verge of remembering the object shown, or if she does just recollect it, but not unless. These following doses will vary in amount as in the case of the second one.

During the progress of the labour it is most important to protect the patient from sensory impressions of all kinds, especially powerful stimuli such as loud noises, bright lights, etc. Unless

the patient happens to be near a noisy thoroughfare there is no need to use more than ordinary precautions to secure quietude. If there be any uncertainty on this point an oiled tampon of wool in each meatus will be enough. If the patient be suddenly roused from sleep or be allowed to recover her memory the incident and a few pains will probably be remembered. Gauss felicitously called this a memory island, and if a number of such occur the patient may reconstruct the whole of the labour from them and may aver she has never been asleep. Above all, nurses must be forbidden to help patients to bear down or handle them roughly. Patients will usually pass urine if told to do so, but if not they must be catheterized at suitable intervals.

Some obstetricians have expressed the opinion that they do not object to giving a patient one dose of scopolamine-morphine, but will not give a second even of scopolamine alone. This has nothing whatever in common with amnesic narcosis, is (to use a homely simile) neither fish, flesh, nor fowl, and will not be further discussed.

For a busy practitioner, however, who has not time to give the attention the above outline demands, there is a modified method, which, while not giving nearly the satisfactory results obtained by the above, may yet achieve about 60 per cent. of successes. The initial dose is given as before, and is followed by, say, 1/450 grain of scopolamine every hour. Not a few cases will recollect most, if not all, the labour, and occasionally one will even be overdosed, but on the whole a good deal of satisfaction can be got out of it.

Something must now be said about the more general effects on the patient, before dealing with those on the infant. The first is the onset of drowsiness, which often asserts itself quite early, usually well within an hour of the first injection. This merges insensibly into definite sleep and is accompanied by flushing—as a rule most marked on the face, but by no means always confined to it. By this time there is generally a pronounced slowing of the pulse, which invariably, provided the technique is correct, at least maintains its volume and character. This is due entirely to the shielding from shock and allaying the nervousness (that is, emotion) of the patient. It is my usual experience that a patient beginning labour with a pulse rate of 100 or over will finish the labour with it in the region of 70. At this time also the pupils are beginning to dilate and remain dilated to the end. This suggests a warning that we must be sure the patient really visualizes the object we show her when testing for amnesia. The uterine contractions continue, but as there is a diminishing demonstration on the part of the patient it has been assumed the contractions also diminish in intensity. I wish to say emphatically this is not so, as can be proved by abdominal palpation. In this connexion it may be added the labour is not prolonged. Those who assert the contrary do so either because they think theoretical considerations demand it or they have used a faulty technique. My experience, extending to over 700 cases, amply proves my contention. Nor is the expulsion of the placenta in any way interfered with, and certainly the incidence of *post-partum* haemorrhage is not increased. But as the patient usually sleeps from one to four hours after the labour she must be watched carefully, because if haemorrhage should occur she will not direct attention to the fact. The most striking after-effect on the mother is a remarkable well-being after the labour. Even the most contentious critic concedes this—indeed is compelled to do so.

It may be as well to say collectively that the main things to avoid are analgesia, restlessness, and a rapid pulse—a syndrome which is a certain indication of overdosing both patient and infant.

Should any operative interference, such as a forceps extraction, be necessary, it is better to give a little of some general anaesthetic, not because it is impossible to do this under omnopon-scopolamine alone, but because we obtain complete passivity of the patient—a very necessary consideration in any delicate manipulation. The quantity of a general anaesthetic needed to secure this end in most cases is surprisingly small.

After all, it is round the question of the interest of the infant that discussion has chiefly centred. Some observers have stated that the risk to the foetus is gravely increased, but as a rule alongside this statement there has been no exact description of the technique used. From what I have already said it may readily be inferred that the margin between amnesia and analgesia is very narrow, and with the least inattention or lack of skill it may easily be overstepped. This is only another way of emphasizing the importance of the memory test. It has repeatedly been said that scopolamine-morphine causes asphyxia, and this with such an air of finality that one would almost conclude it is the only cause of asphyxia. Now the causes of asphyxia are very varied, and if scopolamine-morphine be used, to say that all the cases of asphyxia are due to the drugs is scarcely fair. This is not the place to analyse the figures given by Browne of Edinburgh in a very important and interesting investigation into the causes of death in 200 consecutive cases of stillbirth. The point of interest now is that in these 200 cases no cause of death could be found in two, and it was therefore attributed to scopolamine-morphine. In these two cases the mother had a second dose of morphine, a practice which is now discontinued in Edinburgh and a point on which I have already laid stress.

What occurs unequivocally in a number of cases is a condition of oligopnoea, a condition for which the opium derivative is at least largely responsible. As the operator improves in his judgement and is able to reduce the amount of morphine in suitable cases the incidence of oligopnoea diminishes. It is of course due to absorption of the drug through the placental circulation, and the condition is as follows: immediately on expulsion the infant utters a sharp cry and moves its limbs in the characteristic way, but these become abortive and the child lapses into sleep, the breathing at the same time becoming somewhat shallower and slower. It appears exactly as though the infant were tired, resented any interference, and wanted a little rest before taking on the serious responsibilities of life. If left to itself the child reverts to normal breathing within a short time, and, provided the condition is not accompanied by any cause of a definite asphyxia, no active interference is needed, nor, indeed, wise. So far from being harmful, I am convinced that oligopnoea does no more than shield the infant from the shock of a rough and prolonged passage through a non-resisting bony canal that is usually too small for it. We are apt to forget that an infant's voyage into life is often more stormy than is pleasant, and I am sure this treatment at least reduces the unpleasantness. Contrasted with a prolonged administration of a general anaesthetic the result must be considered at least favourable, for it is admitted the latter may distinctly jeopardize the infant.

In a short paper there are other interesting points which could not be introduced, but many of them have been discussed elsewhere, and I can only add in conclusion that those who have used scopolamine-morphine seriously—such as Buist, Sir Halliday Croom, Freeland and Solomons, Haultain and Swift, Hedley, Hendry, Webb-Johnson, Johnstone, and Nicholson—have a great measure of enthusiasm for it. They avoid any risks contingent upon overdosing by the adoption of a correct technique, and reap the advantages that are offered by no other anaesthetics or analgesics in labour.

II.—THE "STANDARDIZED-DOSAGE" METHOD OF USING SCOPOLAMINE-MORPHINE DURING LABOUR.

BY

N. HIRSCHMAN, M.D.Edin.

THE following observations on 140 cases—63 primiparae and 77 multiparae—of morphine and scopolamine treatment were carried out in the Royal Maternity and Simpson Memorial Hospital, Edinburgh, in 1917. I have to thank my chief, Dr. J. W. Ballantyne, for kindly giving me the scope and allowing me to make use of the material in his term of office. I also have to thank him, as well as Dr. O. Nicholson, for their interest and encouragement while these observations were made.

I shall not dwell on the various criticisms offered against "twilight sleep" by the Berlin school, nor the various methods followed by other men. Most medical men are aware of the nature of this treatment in obstetrics. On the other hand, I know of doctors even now who have, whether in cases of primiparae or multiparae, given one injection of morphine and scopolamine "at any odd time during labour," say they have used "twilight sleep" in these cases, and, when unsuccessful or the babies badly oligopnoeic, become prejudiced and condemn the drug. It is a duty of every medical man practising midwifery to have a good idea of this treatment, if not actually to use it. If this drug is to be

used at all, however, a chance must be given to the busy practitioner who says "he has no time to waste over a confinement," and who, if he did, would only neglect the rest of his practice. The method adopted ought to be simple, and, if carried out by most of us, will have a beneficial effect on the falling birth rate. Just as we are beginning to realize that ante-natal treatment of pregnant women is important, so ought we to make more use of this drug, and by telling the woman who is to be confined that she will have "twilight sleep," thus, in many cases, ease her mind of a dread.

Premature delivery may even occur not only as the result of physical, but also of mental disturbance. The confinement under "twilight sleep," instead of becoming to the morbid woman a possible pathological condition, becomes really a physiological one in the true sense of the word.

In the method I have adopted—the "standardized dosage," as Dr. Greenwood calls it—I have tried to regulate the dosage so that it should dispense with the difficult "individualization" technique of Gauss, and allow a nurse of ordinary intelligence to carry out the doctor's instructions. Except in one case, where I had given a patient who had a very rigid os two doses of chloral—20 grains every twenty minutes—there was no necessity for the nurse to be actually alarmed and to call me.

Dosage.

During my observations I have used the following drugs and doses:

1. Multipara: Initial dose, 2/3 grain omnopon and 1/150 grain scopolamine, with an hourly injection of 1/450 grain scopolamine.
2. Primipara: Initial dose, 1/4 grain morphine and 1/150 grain scopolamine, with an hourly injection of 1/450 grain scopolamine.
3. Primipara: Initial dose, 2/3 grain omnopon and 1/150 grain scopolamine, with an hourly injection of 1/450 grain scopolamine.
4. Primipara: Initial dose, 2/3 grain omnopon and 1/150 grain scopolamine, with an hourly injection of 1/400 grain scopolamine.
5. Multipara: Initial dose, 2/3 grain omnopon and 1/150 grain scopolamine, with an hourly injection of 1/400 grain scopolamine.
6. Multipara: Initial dose, 1/12 grain heroin and 1/150 grain scopolamine, with an hourly injection of 1/450 grain scopolamine.
7. Primipara: Initial dose, 1/4 grain morphine and 1/100 grain scopolamine and 1/150 grain atropine, with an hourly injection of 1/400 grain scopolamine.

I have not repeated the initial injection except in one case where labour had stopped. In this paper I shall point out two main things—namely, that there is a definite "danger period," or "period of oligopnoea," approximately from two to three and a half hours after the initial injection of morphine, and that the combination of atropine, if it does not totally prevent this period, at any rate tends to give us fewer oligopnoeic babies.

Success depends upon the patient's lack of conception of pain after the confinement is over, with no unfavourable result to the child due to the administration of "twilight sleep."

It is advisable that I state here what I mean by the various terms "amnesia," etc., in order to show how I come by my results. After the effects of the drugs have disappeared the patient is questioned as to how much or what she remembers. One might say that this is simply an inversion of Gauss's "memory test" with certain limitations. I place my results in Class I, II, or III accordingly.

CLASS I: *Total Amnesia.*—The patient says she remembers nothing, and has consequently no conception of having had pain during labour.

CLASS II: *Partial Amnesia.*—The patient has perception of pain or recollection of pain during the labour.

CLASS III: *No Amnesia.*—The patient recalls all events in full detail and recollects having had—

(*a*) No pain—complete analgesia or hypalgesia, as Greenwood calls it.
(*b*) Mitigated pain—partial analgesia.
(*c*) Usual pain—no analgesia.

Of course a primipara could not very well refer to pain as "usual." She is therefore asked whether the pain was unbearable or not.

One cannot always tell the ultimate result from the notice the patient takes of the prick of the needle or from her behaviour. There might have been or there may be an "islet of memory" formed. I have seen patients speak and act quite rationally while under the drug and yet remember nothing when questioned after the labour. On the other hand, I have seen cases where apparently no "islets of memory" were caused, and where the patient was drowsy, talking nonsense very often, resulting, if not in a failure, at any rate not in a complete success. Of course, a patient might even tell a deliberate lie. I mention this because I had one case—a primipara—in private practice to whom I had given seven injections. This might, on the other hand, be due to the fact that the patient was never really under the influence of the morphine and that numerous "islets of memory" were formed.

RESULTS.

First Series (Multiparae, 11 Cases).

The cases in this series had an initial dose of 2/3 grain omnopon and 1/150 grain scopolamine, with an hourly injection of 1/150 grain scopolamine. Average number of injections 4.18. Three of the cases were in Class I, 5 in Class II, and 3 in Class III. Five cases had no pain, and the pain was mitigated in 6. Three of the cases had no chloroform at the end of the second stage; 2 cases had only one injection. Both these facts tend to make the percentage too low. There were no restless patients. Four babies were oligopnoeic, but recovered. The first was born spontaneously 2 hours 40 minutes, the second 2 hours 5 minutes, and the third 3 hours 55 minutes after the initial injection; the fourth was a "forceps case" for contracted pelvis. Subtracting this last, the oligopnoeic babies = 27.2 per cent. All the babies were born alive.

Second Series (Primiparae, 13 Cases).

These cases were treated initially with 1/4 grain morphine and 1/150 grain scopolamine, followed by an hourly injection of 1/450 grain scopolamine. Average number of injections 6.5. Eight of the cases were in Class I and 5 in Class II. There was no pain in 9 of the cases, and in the 4 remaining cases it was mitigated. Two cases had no chloroform. One patient was very restless. Five babies were oligopnoeic, but recovered. One was born spontaneously 2¾ hours after the initial dose, and took 15 minutes to cry. Of the four remaining, three were stiff "forceps cases" and the other was a dry labour. There were six "forceps cases." All the babies were born alive. In this series three babies, besides the one mentioned above, were born in the "danger period"; all were lively. I shall refer to this later. One patient had twenty-six hourly injections; she delivered herself spontaneously, the baby being quite lively.

Third Series (Primiparae, 6 Cases).

These patients received an initial dose of 2/3 grain omnopon and 1/150 grain scopolamine, followed by an hourly injection of 1/450 grain scopolamine. Average number of injections 6.8. Five of the cases were in Class I and the other in Class II. In five of the cases there was no pain, and pain was mitigated in the other. One patient had only one injection. There were no restless patients, and none of the babies were oligopnoeic. Of six babies, five were alive and one was a craniotomy. There were three "forceps cases," one for contracted pelvis.

Fourth Series (Primiparae, 30 Cases).

The patients in this series were treated initially with 2/3 grain omnopon and 1/150 grain scopolamine, followed by 1/400 grain scopolamine every hour. Average number of injections 7.2. Twenty-five of the cases were in Class I, 3 in Class II, and 2 in Class III. No pain was experienced in 26 cases, mitigated pain in 2 cases, and "usual pain" in 2 cases. Six cases had no chloroform; 3 cases had only one injection. These facts lower my percentage of successes. Two patients were very restless. Four cases had chloral for rigid os, one having three successive doses, each 20 grains, every twenty minutes. One case had a total of 36 injections, but the treatment was discontinued twice in three days on account of labour stopping on each occasion. There were eleven oligopnoeic babies: one baby was born spontaneously 1 hour 35 minutes after the initial injection and was very oligopnoeic; a second was born spontaneously 3 hours 20 minutes after the initial injection, also oligopnoeic, as well as another 4 hours after. Of the remaining eight, there were six "forceps cases"—three stiff ones—and two breeches. Excluding the three stiff "forceps cases" for large babies, and the breeches, in which there was delay in the after-coming head, we get five oligopnoeic babies. As soon as no chloroform is given or injections are begun late we get a smaller percentage of successes and a higher percentage of oligopnoeic babies. Of thirty babies, twenty-eight were born alive, the other two being unavoidable craniotomies. There were eight "forceps cases," of which two were for large babies—one an impacted shoulder.

Fifth Series (Multiparae, 62 Cases).

These patients were given an initial dose of 2/3 grain omnopon and 1/150 grain scopolamine, with an hourly injection of 1/400 grain scopolamine. Average number of injections 5.09. Forty-two cases were in Class I, 5 in Class II, and 15 in Class III. There was no pain in 47 cases, mitigated pain in 10 cases, and "usual pain" in 5 cases. Five cases had no chloroform, 15 cases had only one injection; 2 cases were very restless; 4 cases had chloral. Seven babies were born in the "danger period"—2 to 3½ hours after the first injection; all of these were born spontaneously; all were badly oligopnoeic, but recovered. There were eleven other babies oligopnoeic. Of these, seven were "forceps cases" for contractions or large babies, and one a difficult breech. Excluding those, we get ten oligopnoeic babies. In 62 cases there were 63 babies (one case of twins). One, an anencephalic, died in twenty minutes. There were three dead babies, of which one was macerated, the second was due to a severe accidental haemorrhage

from a fall, and in the last the mother, after a fall, had not felt life for three days before admission; this was a "forceps case." There were altogether thirteen "forceps cases," of which seven are mentioned above, two prolapsed cords requiring interference, and also in the case of the large child which was dead-born. Thus we get three "forceps cases" apparently due to scopolamine-morphine. (The small hospital percentage here was no doubt due to the fact that I was administering pituitrin in a bigger percentage of cases.)

Sixth Series (Multiparae, 4 Cases).

These four patients received an initial dose of 1/12 grain heroin and 1/150 grain scopolamine, followed by an hourly injection of 1/450 grain scopolamine. Average number of injections 5.2. Three of the cases were in Class II and the other in Class III. In one case there was no pain felt, and in the other three the pain was mitigated. All the patients had chloroform. There were no restless patients. One baby was born 2 hours 25 minutes after the initial injection, but was quite lively. This, in my opinion, shows that the morphine in the initial dose was too small to cause any oligopnoea in spite of the baby being born in the "danger period." For the same reason the total successes are small. There were no dead babies and no "forceps cases."

Seventh Series (Primiparae, 14 Cases).

The patients in this series were treated initially with 1/4 grain morphine, 1/100 grain scopolamine, and 1/150 grain atropine, followed by an hourly injection of 1/400 grain scopolamine. Average number of injections 6.4. Thirteen of the cases were in Class I, the remaining case being in Class II. No pain was felt by thirteen of the patients, and only mitigated pain by the fourteenth. One patient had no chloroform; one was very restless. Four babies were born in the "danger period," but all were lively; this, I am sure, was due to the fact that 1/150 grain atropine was added to the initial dose. (A larger dose of scopolamine was used.) The other cases had only 1/150 grain scopolamine. Thirteen babies were born alive and one dead, the latter being born spontaneously; it had blood in its mouth and nose, was very badly nourished, and the coils of the cord were thin and few. There were two "forceps cases."

Apart from the different doses used, if we take "twilight sleep" as having been used in 140 cases of multiparae and primiparae we find that there were 141 babies born, of which 7 were dead—3 unavoidable craniotomies, 1 macerated foetus, 1 due to severe accidental haemorrhage (Series V), 1 in which the mother felt no life for three days (Series V), and 1 where the baby was badly nourished (Series VII). This gives us 134 live babies, of which one, an anencephalic, died after twenty minutes. If the last three are considered as being due to the treatment, we get 2.1 per cent. of dead babies. If the last one only is considered, then we get 0.74 per cent. dead babies. The high percentage of "forceps cases" is unavoidable where the institution is one for teaching purposes. Besides that, when the second stage has lasted about two to three and a half hours the patient is as a rule delivered with forceps. Another point to be considered is that when the patient is admitted to a public hospital and is in labour, she is given a bath first before being brought to the labour ward. Injections are therefore given very late, the pains being usually severe.

Results Compared in Different Series.

In comparing the results in the different series, I to VII, it is easily seen that a higher percentage of successes is found in the cases of primiparae. It is certainly due to the fact that labour is more prolonged, thus necessitating a larger number of injections and so conducing to a better amnesic and analgesic effect. For the same reason we find that, in a percentage of multiparae, only one or two injections are given with not such a good effect apart from any idiosyncrasy to the drug. As regards the primiparae, the percentage of successes is raised and that of failures lessened. Those primiparae treated with 2/3 grain omnopon and 1/150 grain scopolamine show a much better result than those treated with morphine and scopolamine. The omnopon also seems to have a less toxic effect, not only on the patient but also on the foetus. The scopolamine has a quicker effect, and, when the babies are born, they are a good deal less blue. Heroin 1/12 grain is certainly too small a dose for an initial injection. Although the percentage of complete successes is small, the partial successes are fairly good. In Series VII, the addition of atropine 1/150 grain has had a remarkable effect. The result here contradicts Dr. Innes and others, who used atropine in their cases. Any toxic action the morphine has in the mother or child seems to be counteracted by this drug. The fact that the babies born in the "danger period" were not oligopnoeic is not, in my opinion, due to mere coincidence. The forceps cases were also less (compare, for example, with Series II); the restless patients gave as little trouble as the others, if not less than usual. There were no absolute failures.

Complications.

Restlessness may occur not only after giving two or three injections of scopolamine but also after twenty, thirty, or more. It is not always due to an idiosyncrasy of the patient to the drug, but very often to faulty technique or carelessness on the part of the attendant in ministering to the patient's needs. In every case I have found that there is thirst to a greater or less degree. Even when the patient does not ask for a drink, small sips of water or milk, especially if she is restless, ought to be given. Apart from actually giving fluid, the face, lips, and gums of the patient should be constantly moistened by the attendant. Especially when the head is on the perineum, the patient is very apt to put her hands down to the vulva during a pain. If sepsis is to be avoided, this particularly should be prevented. The nurse should be very careful not to allow the bladder to become distended, for obvious reasons, and should persuade and encourage the patient to pass water at regular intervals, depending on the quantity of fluid taken and the length of the labour. If necessary a catheter should be passed. The patient will not always ask for what she wants.

Effects on the Mother.

The nurse ought not to hold a conversation with the patient in any way except in so far as is essential. Some patients talk quite rationally, are not much flushed, the Babinski sign and pupil reflexes may be absent, muscular co-ordination may be good, and yet they may turn out to be very good cases of "twilight sleep," and vice versa. The value of suggestion on restless patients is very notable. I have seen very restless cases, where I have suggested that "they are tired and want to sleep," become absolutely calm. I have never had occasion to discontinue treatment in these cases, nor have I observed any active or muttering delirium. It is probably faulty technique. In a few cases, as mentioned previously, where the os has been very rigid, I have given chloral in 20-grain doses every twenty minutes up to three doses if necessary, before starting on the morphine-scopolamine. The dose is certainly heroic, but the doctor ought not to leave the case during the time. It has one advantage—namely, that the patient does not realize when she is getting the initial dose of morphine-scopolamine, this fact tending later to make the case more successful. The patient ought in all cases to have chloroform at the end of the second stage, in order that she should not retain any idea of the labour from an "islet of memory" being formed, due to the more intense pain.

A remarkable after-effect on the mother is the absence of shock and exhaustion, either subjectively or objectively, occurring not only in short labours but also in lengthy complicated ones. This necessarily tends to make the convalescence quicker and more pleasant, inasmuch as nervous energy is conserved. In most cases of multiparae, if morphine 1/4 grain or omnopon 2/3 grain is to be given it should, even at the risk of labour stopping again, be administered at the very beginning, judging only from the state of the os, and not from the actual severity of the pain. It is well known that some multiparae will often not have acute pain until the os is fully dilated or even the head on the perineum. If there is any reason to anticipate a fairly rapid course of labour, and a risk of the child being born in the "danger period," a smaller dose of morphine or omnopon than usual should be given, with more frequent injections of scopolamine or a larger initial dose of scopolamine. The dose of morphine is the governing factor, and unless this be given before the pains become acute no complete success need as a rule be expected.

One great disadvantage I must mention, apart from any method adopted. With the average general practitioner who treats patients with "twilight sleep," and who has not had a very great experience of this drug, vaginal examinations, particularly in multiparae, are necessarily increased. This is a fact even with his more experienced colleagues. If puerperal infection, caused as a rule by sepsis from without inwards, is to be avoided, and the percentage of deaths lessened, then it is the duty of everyone using this treatment to be particularly careful, and not give occasion for further criticism on the part of those who already condemn the drug.

Effects on the Child.

I do not think it is necessary to listen to the foetal heart any more than in cases not treated by morphine-scopolamine. Any cause for anxiety that there is—apart from the child being born in the "danger period" (this not being a real

danger)—depends on other complications. The baby, no matter what success or failure the case has been, is always more or less blue. There is never really that pink colour seen. Scopolamine babies invariably seem to have more viscid mucus in their throats than those born otherwise. I make it a rule in every case where the child is not lively to ligate the cord immediately and use a mucus extractor. Of twenty-three babies born spontaneously up to two hours after the initial injection only two were oligopnoeic. Judging by what the nursing staff told me in the hospital, the scopolamine babies seem more quiet and contented than any others. Whether this is merely the imagination of enthusiasm or not I am not prepared to say. It is, at any rate, a known fact that the drugs are excreted by the child in a few hours, so one cannot say that the babies are still stupid from the effects of the drug.

Conclusions.

On looking through my results of morphine-scopolamine treatment on 140 cases carried out in the Royal Maternity and Simpson Memorial Hospital, I have come to the following conclusions: It is the morphine which causes the analgesic effect in the mother primarily, and allows the scopolamine to take effect. A second dose of morphine is not necessary, but where for any particular reason the doctor thinks it is required he should make quite certain, first of all, that the child is not likely to be born in the "danger period"—namely, from two to three and a half hours after the last injection of morphine. If it is born in that interval it will be very oligopnoeic. A smaller dose of morphine—for example, heroin 1/12 grain—although likely to cause little amnesic or analgesic effect in the mother, will not cause this oligopnoea. The reason I use the word "danger" is in order to keep the doctor on the *qui vive* and make him realize this period before commencing treatment. The baby born in this period may not be in any apparent danger, but will likely cause some anxiety before it breathes properly and cries.

The "danger period" can be avoided by combining a dose of atropine—for example, 1/150 grain—with the initial injection of morphine-scopolamine. From the similarity of its action to scopolamine and its effect on the brain, I think the amnesia becomes more pronounced, at the same time preventing the toxic action of the morphine. If, knowing that the atropine is an antidote to morphine, we allow the latter to act first for half an hour and then inject the atropine, we might get a still better result. Although I have used different doses —"standardized dosage" method—in treating the primiparae and multiparae in the 140 cases, I have seen that the initial dose of morphine 1/4 grain, scopolamine 1/100 grain, and atropine 1/150 grain, followed by scopolamine 1/400 grain hourly (mentioned in Series VII), is the best from every point of view. The babies in a set of 14 primiparae were all lively; the "forceps cases," apparently due to the treatment, in comparison with those known to be from a definite cause like contracted pelvis, were less so. (Instead of morphine 1/4 grain, I think 1/2 or 2/3 grain omnopon would be better.)

The initial dose of scopolamine ought always to be 1/100 grain, apart from any idiosyncrasy of the patient to the drug, although, as I said before, the initial dose of morphine is the governing factor in multiparae. The initial dose of morphine should be from heroin 1/12 grain to omnopon 2/3 grain, depending on how long labour is expected to last. It is certainly advisable, although not essential, to have a nurse in attendance who has seen the effects and nursed cases of "twilight sleep." She must be in constant attendance upon the patient, not leaving her alone for a moment.

The morphine-scopolamine treatment is particularly indicated in primiparae and in cases where a lengthy, severe labour might be expected. If pituitrin is to be given at all during the labour, it is certainly less torture to the patient to be under morphine-scopolamine narcosis or semi-narcosis than otherwise. A little chloroform before giving the first injection certainly helps to make the patient drowsy, but this is inadvisable, as many people, particularly primiparae, cannot bear the smell of this drug. The "standardized dosage" method is to save the doctor trouble and allow him to go about his other duties. For the same reason whiffs of chloroform for restlessness are out of the question. Chloroform should, however, be administered at the very end of the second stage, not only for obstetrical reasons, but also because it prevents "islets of memory," or impressions, on the brain.

I am sure, no matter which method is followed, that in most cases of "twilight sleep" there is not that complete alertness and desperation present when the patient has to bear down. This would no doubt tend to make "forceps cases" more frequent. Pituitrin, however, overcomes this disadvantage as a rule. The advantages in using the treatment outweigh the disadvantages by far. With ordinary reasonable care there certainly need not be any untoward effects on the mother, and very little, if any, on the child.

Post-partum haemorrhage and manual extraction of the placenta do not occur more frequently than usual. There are some who say that this treatment is liable to cause some defect or ill effect later in the child. I can only say that I have had an opportunity in private practice of observing the babies born under the treatment, and they were all apparently healthy and bright. Looking at morphine-scopolamine treatment from an ante-natal point of view, I think it is an unquestionable fact that the thought of having this treatment is bound to react favourably on the mental and physical condition of the mother, and therefore on the child. If we have to consider the ante-natal care of a pregnant woman, we must try and cure not only her physical symptoms, but also, in those who dread and fear the impending labour, as mentioned previously, their mental symptoms as well.

III.—ON THE MAINTENANCE OF "OBSTETRIC ANAESTHESIA" BY MEANS OF INFUNDIBULIN AND CHLOROFORM.

BY

A. F. MARTIN, M.D., Ch.B.Vict.,

Bradford.

IT is not now too much to say that sufficient anaesthesia to dull the pains of labour to the point of complete amnesia can be maintained without the use of morphine or hyoscine or other alkaloid, and without their attendant tedious protraction of labour. After considerable experience I may say that to the busy general practitioner the disadvantages of the alkaloid method are: (1) that it undoubtedly does lengthen labour by making the pains less frequent and weaker, and by making the patient so drowsy that she cannot help herself by her own efforts of expulsion, thus rendering forceps operations more frequent; (2) that unless the first dose is given at the right time the uterine reflex will not be denied, and it is often impossible to obtain an amnesia.

The method to be described makes labour pains stronger and more frequent, does not deprive the woman of her expulsive powers, and can be begun at any time during the course of labour.

It is universally admitted that chloroform, unaided, defeats its own ends in midwifery by sacrificing the efficiency of the pains. But if the uterine reflex is kept active by repeated small doses of infundibulin, while a *light* chloroform anaesthesia is maintained, our aim of a virtually painless unimpeded childbirth is realized.

The peculiarly favourable behaviour of the parturient woman to chloroform has never been satisfactorily accounted for. If a Junker inhaler be used a fineness in regulating the degree of anaesthesia can be obtained which is not possible by the open method—namely, a state in which the corneal reflex is not abolished but dulled, where the woman still "bears down" to her pains and yet remembers very little of them, in spite of their accentuated and augmented recurrence. But I had never succeeded in maintaining this condition until about three years ago, when I began to realize that the pituitarized uterus could maintain itself against the numbing effect of chloroform.

The technique I have used is as follows:

Having diagnosed an anterior presentation and ascertained that dilatation is fairly full, and that there is no undue disproportion between the child's head and the maternal parts, 1/2 c.cm. of infundibulin is injected intramuscularly, and, when the augmentation of the pains is seen to begin, chloroform is given through a Junker inhaler attached to a mask, which was secured earlier to the woman's face, she lying in the usual position on her side, pulling on a strap. The chloroform is continued as long as the pain lasts, and then stopped, and given again at the onset of the next pain.

The infundibulin stimulates the activity of the uterus so markedly that this amounts very soon to maintaining the light anaesthesia described above. As the effect of the infundibulin wears off the chloroform begins to be the predominant factor, and the vigour of the pains abates. This usually happens by the end of half an hour or so. Now one renews the infundibulin, and continues as much chloroform as is

thought necessary. A little practice will soon enable one to judge of the depth of anaesthesia needed to produce amnesia. This *modus operandi* can be kept up indefinitely, the effect of the pains being watched, while the accoucheur sits at the foot of the patient, pumping his chloroform through a long tube to the facepiece at the patient's head. Single-handed chloroform by the open method can easily become a haphazard procedure.

I have often given 2 c.cm. of infundibulin in two hours, and several times 3 c.cm. in three hours, but have never exceeded this dose, and only once given more than 0.5 c.cm. in a dose, which Dr. Blair Bell, in a very kind letter to me, agrees is non-toxic. His opinion is, however, that a dose of 3 c.cm. should not be exceeded until after twelve hours have elapsed. My impression is that an unusual increase in the pulse rate is observed in a few cases towards the end and after labour, but there are no definite toxic effects of multiple dosage up to the above limit to either mother or child, if ordinary care is used.

Another question arises as to whether, infrequently, infundibulin is a factor in the causation of *post-partum* haemorrhage. I can imagine that when the infundibulin is unduly active, and placental separation is violent and rapid, more venous sinuses would be open at one time, and the clotting of the blood less complete than when separation is more deliberate, and thus haemorrhage be more abundant.

And again, does prolonged chloroform anaesthesia interfere with the clotting power of the blood? Undoubtedly it does, but it must be remembered that, in this procedure, the chloroform anaesthesia is only very light, and the amount used insignificant—never more than 1½ to 2 oz. in two or three hours, and since I have used a Junker inhaler, as suggested to me by my friend Dr. Carroll, I have found the amount used has been much less. In any case an injection of haemoplastin early in what promises to be a prolonged case should ensure safety. In only one instance have I had some *post-partum* haemorrhage in thirty-three labours conducted in this way, and this was in spite of the uterus being firmly contracted, and in spite of the absence of laceration from overaction, as ascertained subsequently. The indications for forceps remain as in unaided cases, but the incidence of forceps operations has steadily decreased since I have adopted this practice. I have only had to use forceps twice, both for primiparae—once in 1920 and once in 1921—both for delay of the head for over half an hour, in spite of regularly recurring pains. It has seemed to me that the chloroform helps to undo the spasmodic involuntary tightening of the maternal parts which occurs in nervous women during severe pains. This and the increased uterine action account for the rarity of forceps operations.

In occipito-posterior presentations delivery is obtained without the aid of forceps by rotating the head and, at the same time, turning the body by the shoulder into the anterior position under full chloroform. The head is held by the hand that has turned it until the pains, abolished by the chloroform, have been re-established. This is attained in a few minutes by the nurse giving a previously prepared dose of 1 c.cm. The effects of the chloroform will prevent any uterine overaction, and the brisk uterine contraction will fix the foetus in the anterior position. I have notes of four such cases, and these are the only occasions on which one has given a full cubic centimetre. All four have been delivered without forceps.

When the head is stretching the perineum and not receding, the force of the pains can be checked by increasing the amount of chloroform used, and extensive rupture often avoided. Lind Smith[1] agrees that chloroform modifies the effect of infundibulin, and recommends repetition of the dose. I have notes of 32 cases, taken over three years for my own guidance, long before I thought of publication. Most have had three 1/2 c.cm. injections, some two, and one only one. Others, where I was earlier on the scene, or where longer labour has ensued, have had five or six injections, and labour has lasted three hours. One of my patients, an intelligent woman, who has had three scopolamine-morphine labours, said she much preferred the infundibulin-chloroform method. She had three injections, labour lasted one and a half hours, and she voluntarily told me that loss of memory had been more quickly obtained and was more complete with the latter. The only danger lies in overdosage of chloroform; this is minimized by using the Junker inhaler. I make it a rule always to avoid heavy stertorous breathing.

I can confidently recommend this procedure as being superior to the alkaloid method in general practice. I have seen no bad results to either mother or child.

A few illustrative cases may be acceptable.

CASE I.

Mrs. S., aged 36; 2-para. Infundibulin 2.5 c.cm. injected in one and three-quarter hours; 1 oz. of chloroform used through a Junker inhaler. The amount used here was rather large, but one knew the uterine pains were poor and infrequent during a very tedious day eight years ago at the first labour, which ended with a hard forceps operation, so that the infundibulin was repeated when the pains seemed to flag rather more freely than is usually necessary. No increase of bleeding; no remembrance of the second injection or afterwards.

CASE II.

Mrs. F., aged 28; primipara. The first injection was given when the os was the size of a crown piece, very soft, and distending well with a good bag of membranes. The membranes did not rupture until after the third injection; 3 c.cm. of infundibulin were used in three hours. Complete amnesia was obtained, although for two hours the patient pulled on the strap and bore down to her pains. Two ounces of chloroform—open method—were used.

CASE III.

Mrs. H., aged 39; 2-para. First dose just before the cervix was fully dilated; repeated at half-hourly intervals; 1½ oz. of chloroform used in two hours—open method. No remembrance after second injection. No bleeding. Pulse quick after labour, but settled down after the one necessary perineal suture had been put in. This patient was sent home from India with amoebic dysentery, and was a wreck at seven months, but her general condition was quite good at the time of labour; a quick pulse after a two hours' labour and some undue pallor is explained apart from the anaesthesia. Scopolamine-morphine was absolutely without effect when used for her first baby five years before.

CASE IV.

Mrs. E., 2-para. Delivered in two hours; 6 drachms of chloroform by Junker inhaler; 2 c.cm. infundibulin. The pulse was always too quick—about 100 very early in labour between the pains, and later 108. She had had twenty-four hours of ineffective pains before dilatation was on the way, was anaemic and not in good condition. The mother told me afterwards she had not been well throughout the pregnancy. I should not have begun the treatment without weighing up the probabilities. She can remember three injections and some of the pains. This was the same with scopolamine-morphine, which had to be abandoned at the first confinement owing to uterine inertia and quick pulse, and completed with infundibulin and chloroform. She vomited all night after confinement, kept a small pulse, and had much after-pain. Although the uterus contracted firmly *post-partum* haemorrhage was too excessive, but the placenta seemed huge. It weighed after draining the blood from it 1 lb. 10 oz., and measured 9 inches by 8 inches. It can be argued that this *post-partum* haemorrhage would have occurred in any case, and was due to large placenta and poor general condition.

This is the only set-back I have had, and made me vow never to give this anaesthesia in labour without carefully considering the case before beginning, and never to promise unreservedly to use it beforehand. She had a slow pulse two days after, and never looked back. Examination at the end of a month showed a perfectly regularly closed os, and no other abnormality. She was a case, fortunately rare I believe, where the stage of light anaesthesia is not sufficient to abolish the memory of the pains. Her unsatisfactory condition forbade deeper anaesthesia.

CASE V.

Mrs. H., 2-para. Infundibulin 2 c.cm. used in two hours, and only 3 drachms of chloroform with Junker inhaler. Patient says she can remember some of the pains. Too little chloroform was used here.

CASE VI.

Mrs. S., 2-para (midwife's case). Three hours' delay in pelvis. Occipito-posterior presentation diagnosed; head rotated and held; 1 c.cm. of infundibulin used. Firm uterine action five minutes later. Spontaneous delivery.

I have noticed several times, where the uterus has contracted very violently, the tail of the membranes is held, being caught in the enfolded uterus. The tail, stretching with the weight of the still attached placenta, eventually may break, and quite a large piece of membrane can be left behind if, after the placenta is delivered, any tension on the membranes is allowed when they are felt to be held. The safe thing to do is to secure the tense cord of membranes with a Spencer Wells forceps, cut the placenta and distal main part of the membranes away, so avoiding tension, and allow the tag to come away when the uterine contraction slackens.

Conclusions.

1. The woman in labour, being peculiarly amenable to the action of chloroform, can be rendered amnesic by maintaining a light partial anaesthesia, which is harmless to mother and child, if the uterus be kept active by means of repeated small doses of infundibulin.

2. Usually 0.5 c.cm. of infundibulin, every half-hour or so, is enough, the chloroform being administered with the onset of and during the pains.

3. A Junker inhaler is a valuable help in avoiding the use of too much chloroform and regulating the dose. The amount used will vary, 3 drachms in the hour being the least with which I have obtained a satisfactory amnesia.

REFERENCE.
[1]Lind Smith: BRITISH MEDICAL JOURNAL, December 18th, 1920.

DISCUSSION.

The PRESIDENT said that personally he fully admitted that all the results claimed could be substantiated, but he thought that the matter was essentially one for discussion by general practitioners; it might even in time become a subject for consideration by midwives, though he certainly would not advocate that at present. Still, considering the many commitments of a man in busy practice, might not the carrying out of the treatment often be left to the nurse?

Dr. LAPTHORN SMITH had observed that in one town the most successful practitioner was one who gave his confinement cases morphine. He thought the suffering in the early stages of labour was generally due to fear. He advocated sodium bromide and opium particularly for primiparae when the pains commenced in the middle of the night. Another excellent prescription was acetanilide in 5-grain doses, given in a cup of hot coffee for three doses at least. He had tried the scopolamine morphine method but had given it up, owing to a great increase in the number of cases causing anxiety after its use. He suggested the substitution of eau-de-Cologne for the alcohol in the ordinary A.C.E. mixture; it made a very pleasant anaesthetic. For the past thirty years in every case to which he had been called in time he had administered an anaesthetic. He entered a protest against the use of the term "twilight sleep," as it had become commercialized.

Dr. CHALMERS thought that Dr. Martin did not bring his forces into play until the period of greatest anxiety was passed. He was in favour of omnopon and scopolamine, but agreed that if morphine were given within six hours of the birth of the child trouble with the child might be anticipated.

Dr. RUSSELL ANDREWS gave a warning about pituitary extract. He said that standardization of this preparation was at present in a state of utter chaos; strengths varied to an enormous degree. If the weakest brand was called 1, then the strongest had been found to be 80, yet the dosage was given as the same in both preparations.

Dr. RUXTON spoke as a general practitioner and a physician to a lying-in hospital. He had found very little demand for scopolamine-morphine treatment even among the highly educated. His view was that in private practice the complete scopolamine-morphine technique was not practicable. Those who asked for it should go into an establishment where the whole thing was thoroughly understood. He advocated the old-fashioned treatment—an injection of morphine in slow cases was the best. He was convinced that the great principle "wait and see" was indicated in all cases. He asked for guidance whether it was safe to use scopolamine-morphine in diabetic patients.

Dr. BLAIR, speaking as a general practitioner of thirty years' standing, said that he had had 120 cases of "twilight sleep." He had now abandoned it, as he had found that it was impossible to carry out the method properly in a scattered area. His practice lay in an area of 300 square miles. In addition, there were, he thought, certain dangers in the practice; for instance, he had had two cases of very bad puerperal mania. He had now gone back to the old treatment—a dose of opium if seen in the early stages, to be repeated if necessary. He had abandoned "twilight sleep" as there were no advantages in employing it. He had had a great deal of trouble with his babies, and he could see no compensations in the use of this method by busy general practitioners.

Dr. LAMOND LACKIE said that he had used morphine-scopolamine narcosis in hundreds of cases, and he was a strong believer in the treatment. Dr. Ruxton had said that the great thing in obstetrics was to "wait and see." With that Dr. Lackie entirely agreed, and the greatest advantage of "twilight sleep" was that it allowed one to wait and give nature a chance with the minimum of suffering to the patient. His record showed that in 50 per cent. of cases the treatment was an unqualified success, in 30 per cent. it was only a partial success, and in 20 per cent. it was a failure. There were never any ill effects to the mother. Occasionally one met with a case in which almost a maniacal condition was produced, but this was temporary and passed off with the cessation of the treatment. The effect on the baby was, no doubt, sometimes disturbing and even alarming, but there were only two cases in the records of the Royal Maternity Hospital, in which the death of the infant was attributed by Dr. Browne, the pathologist, to morphine-scopolamine narcosis. The effect on the doctor was that it often gave him a good night's rest when otherwise he would have been in constant attendance upon the patient. A good nurse was easily trained to carry out the treatment and to give the injections intelligently.

Dr. PRELL said that it was not his successful cases that made a doctor's reputation, but the way he could cover up his failures. He pleaded for a higher degree of co-operation between the doctors and the midwives. He thought that many doctors might be deterred from testing the omnopon-scopolamine method as the other doctors in his district would not try it.

Dr. MILLER said that he had no experience of the "twilight sleep" method. In the Highlands they practised other forms of treatment during labour, with the result that nature was mostly trusted to, and nature was highly successful.

Dr. THOMAS absolutely agreed with the previous speaker. He asked, if there were such a thing as natural labour, why was there all this talk about interference?

Mr. HENDRY described how the term "twilight sleep" came to be adopted by the public press. Referring to dosage, he quoted Gauss as saying that if he were shown the standard woman he would say what the standard dose should be. Individuals differed markedly. He did not think that the best results could be obtained by giving table doses; doses must be varied to suit each individual. In regard to mania, some 4 to 10 per cent. of his cases had shown varying degrees of restlessness, but he thought that with careful dosage this could be avoided. The effects on the child were probably produced by some derivative of morphine. Frequently the child was born in a state of apnoea, but in his experience they always came round without the need for any active interference.

Dr. EDEN said that he had listened with the greatest delight to the remarks contributed by the general practitioners. They were packed with common sense, whereas often the remarks of the specialists were not. They could not all expect to obtain the splendid results of Dr. Greenwood. He did not think that Dr. Martin's method came into conflict with the scopolamine-morphine method; rather it was a method for shortening the second stage, and he questioned the wisdom of doing this. He could not say that he was greatly in favour of "twilight sleep." Special hospital "stunts" could not be applied in general practice.

Dr. GREENWOOD, in reply, said that he would not trust any nurse to carry out the treatment. The doctor should visit the patient at least once an hour. The bad results all came from pushing the drugs beyond their obstetric dosage. Analgesia was not required, only amnesia. He could not emphasize too strongly that they must carefully watch each patient. He thought it was the duty of the profession to shield the patient in labour by every means possible. Pain, fear, shock, exhaustion must be diminished as much as possible. Labour should be tackled in the same spirit as the surgeon tackled his difficulties. It was not a question of supply and demand by the patient. He had no experience of giving scopolamine-morphine in diabetes, but on theoretical grounds there was no contraindication, and he would not hesitate to employ it if a case presented itself. As regards extreme restlessness and mania these cases were certainly a sign of faulty technique. Restlessness, analgesia, rapid pulse were danger signals. He thought the giving of opium was a distinct menace to the child, and in many cases of eclampsia the child died from the effects of the morphine and not the toxaemia. He could not agree that "twilight sleep" prolonged labour—if it did, it was a sign that the technique was at fault. His experience was that in many cases labour was actually shortened, as the patient would permit the full contraction of her voluntary muscles, and thus assist the involuntary muscles to expel the child.

THE TREATMENT OF ECLAMPSIA.

BY

THOMAS WATTS EDEN, M.D., F.R.C.P.,

Obstetric Physician, Charing Cross Hospital.

ECLAMPSIA has long been recognized as one of the most formidable of the risks of child-bearing. It is, however, of comparatively rare occurrence. Its frequency in hospital practice is about 1 in 125 labours, but this figure is, of course, higher than its average frequency, because a great proportion of the cases which occur are sent into hospital. The reports of the Registrars-General for Great Britain and Ireland for the ten years 1911–20 show that the average number of deaths per annum returned for puerperal convulsions was 630, the annual total varying from 733 to 551. From statistics which will be presently quoted it may be taken that the average mortality of the disease in Great Britain and Ireland is 22.5 per cent. Accordingly, the total number of cases occurring annually is about 2,800. Of this number something like 1 in every 4 or 5 dies. About 70 per cent. of eclampsia patients are primigravidae, and it follows that this disease takes toll in this country of the lives of about 450 young mothers bearing their first child every year. No better reason for discussing the treatment of this disease at this meeting could be advanced than is supplied by these figures.

A brief retrospect of the methods of treatment which have been in vogue at different times will perhaps be useful, in order to explain to some extent the confusion which still exists. Previous to the discovery of albumin in the urine in eclampsia in 1843, the credit of which is due to a London obstetrician named Lever, the treatment was solely empirical. The detection of albumin in the urine appeared to the men of that time to stamp the condition as primarily a disease of the kidneys. This view was held, in one form or another, until the toxaemic theory arose, by which the renal lesions were relegated to a secondary place, although their clinical importance was not thereby much diminished.

From 1843 up to 1870 treatment, generally speaking, consisted in: (*a*) venesection, repeatedly in some cases, unless contraindicated by marked anaemia; (*b*) morphine or opium in cases where venesection was contraindicated; (*c*) ice-cap, cold packs, or cold baths, wet cupping the loins, etc.; (*d*) no obstetric interference. There are no statistical results from this period.

From 1870 to 1890 treatment was still entirely expectant, narcosis and diaphoresis being mostly relied upon. Pilocarpine played a large part, and venesection was largely abandoned, as Schröder pointed out that the blood pressure rose again very rapidly afterwards, and the only lasting effect was to deprive the patient of blood. At this time the case mortality in Germany was about 33 per cent.; there are no statistics from this period available for this country.

In the late eighties the toxaemic theory began to be discussed. Bouffe de Saint-Blaise observed *post mortem* hepatic lesions, and spoke of a hepatic toxaemia as being the cause of the disease. Dührssen, no doubt influenced by these considerations, conceived the idea that immediate termination of pregnancy was the proper way to attack a pregnancy toxaemia, and in 1891 he advocated Caesarean section in all cases, to be performed immediately after the occurrence of the first fit. A few years later he introduced his special method of vaginal Caesarean section. Medical treatment he relegated to a position of unimportance. This treatment caught the fancy of the profession, and had a great vogue not only in Germany but also in the United States of America, for as early as 1911 Petersen was able to collect 530 cases treated by this method in America since Dührssen introduced it twenty years previously; under early surgical intervention upon these lines the mortality in Germany fell from 33 to 18 and 19 per cent.

Other workers, however, continued to practise expectant methods, and wonderfully good results were reported from Russia by Stroganoff as early as 1901. In 1911 he was able to report 600 cases treated by his method in Russia, with a mortality of only 8 per cent. Zweifel about the same time reported a series of 84 cases treated by a modified Stroganoff method with a mortality of only 5.9 per cent. Stroganoff's method was purely expectant, the following being the main points:

1. Isolation of the patient in a darkened, quiet room.
2. Careful attention to the respiratory process: (*a*) cleaning the mouth, throat, and nose after fits, and keeping the patient lying on her side; (*b*) fresh air and, if marked cyanosis, oxygen.
3. Morphine subcutaneously, and chloral per rectum in alternate doses and at stated intervals until fits are controlled, as follows:

0 (zero)	...	...	...	Morphine gr. ¼
1 hour	...	...	...	Chloral gr. 30
3 hours	...	...	...	Morphine gr. ¼
7 hours	...	...	...	Chloral gr. 30
13 hours	...	...	...	Chloral gr. 22
21 hours	...	...	...	Chloral gr. 22

4. Twenty-five ounces of milk a day, and the same amount of saline per rectum or by the mouth; no other food.
5. Termination of labour when the second stage is advanced.

During the last twenty years the treatment of eclampsia in this country has been, generally speaking, at the mercy of these two antagonistic views—the view represented by Dührssen that active obstetric interference should be practised, and practised early, and the view upheld by Stroganoff that obstetric interference should be avoided until the second stage of labour is advanced, and that the toxaemic condition should be treated by the simple medical measures just described. Individual clinical observers have emphasized the importance of certain special therapeutic measures, such as saline transfusion, administration of thyroid gland, or of depressants of the circulation, such as veratrone. It is not surprising to find that the prevalence of such divergent views upon the principles which should underlie treatment has produced confusion in the minds not only of practitioners and resident medical officers, but also in the minds of many of the obstetric teachers themselves. The hospital treatment of eclampsia, generally speaking, is to-day in a condition of muddled disorder which is not to our credit. An exception must be made in the case of Dublin, where a uniform plan of treatment has been practised for some ten years, with results of the most encouraging character; but to this matter I shall have to refer again later on.

How serious were the results of this lack of precision in our views as to the principles upon which the treatment of eclampsia should be based was not perhaps generally realized until this summer, when a series of reports on this subject were presented to the British Congress of Obstetrics and Gynaecology at Liverpool. These reports will shortly be published in full in the *Journal of Obstetrics and Gynaecology of the British Empire*. I can only say here that the records of over 2,000 consecutive cases of eclampsia treated in hospital, occurring in the ten years 1912–21, were carefully investigated; 1,800 of them were from England, Scotland, and Wales; 200 from Ireland. The English, Scottish, and Welsh cases together showed a mortality of 24 per cent.; in other words, about 1 in every 4 cases admitted to hospital died. That this mortality rate is capable of great reduction is shown by the cases from Ireland, which showed a mortality of only 10.29 per cent. It is true that the number of cases from Ireland is very small, amounting to only 10 per cent. of the total, but we need not allow this to influence our judgement upon them unduly.

This rather lengthy introduction is intended to emphasize the practical importance of the subject and to point out some of the difficulties. One further preliminary remark I feel bound to make, and that is that we cannot wait any longer for the pathologists. Eclampsia is a disease the causation of which is still unsettled, in the sense that it has not been demonstrated to the general satisfaction. The toxaemic theory has been very widely, but not universally, accepted, and it must be admitted that it is a hypothesis which is not entirely free from difficulties. I conceive that the time is opportune for an effort to be made to introduce something approaching uniformity into the treatment of this disease, and in order to explore the situation I propose now to submit a short series of propositions to you which cover the main points upon which, in my opinion, treatment should be based.

I. *It is easier to prevent eclampsia than to cure it. Prophylaxis is therefore all-important.*

The reports to which I have just referred show that in over 80 per cent. of cases of eclampsia premonitory symptoms are present, the commonest of which are albuminuria and oedema. In addition to these there will generally be found headache, disturbances of sight, and epigastric pain, sometimes accompanied by vomiting; more rarely there may be muscular twitchings or attacks of petit mal. Careful

supervision of the patient during pregnancy by her private doctor or at the ante-natal clinic would undoubtedly afford an opportunity for a large proportion of cases of threatened eclampsia to be treated by preventive measures before the onset of fits. It is not certain that all patients with premonitory symptoms will necessarily develop fits, but what I desire to point out is that treatment at this stage may snatch women from the very threshold of this formidable disease.

I cannot give you any figures upon this point, but it is the universal experience that women treated in the premonitory stage very rarely develop fits, and, even if they do so, the disease assumes a mild form. It is reasonable to suppose, therefore, that prophylactic treatment would appreciably reduce both the frequency and the severity of the disease.

I am not unaware of the difficulty not infrequently met with of persuading pregnant women to come up at regular intervals to see their doctor, but the public is becoming gradually enlightened as to the importance of medical supervision during pregnancy, and this difficulty is now much less formidable than it used to be, especially in the case of women bearing their first child. It goes without saying that it is also necessary that doctors and midwives should have a clear idea of the nature of the premonitory symptoms, otherwise even when they occur their grave significance may be overlooked.

Prophylactic treatment essentially is: Bed; fluid diet only, and that mostly water; saline purgatives; diuretics. Progress must be closely watched, the salient points to observe being amount of urine, amount of albumin, the oedema, and, lastly, blood pressure. If progress is not satisfactory, or if relapses occur after temporary improvement, labour should be at once induced without regard to the period of pregnancy or the possibility of survival of the child. Further, I personally do not think it is right to allow a woman who has once been on the verge of eclampsia to carry through to term, and therefore all cases which have developed the symptom complex just described should be induced, although it is preferable, if possible, to defer the induction until the symptoms have disappeared under treatment.

II. *A case of eclampsia is not a case for domiciliary treatment; prompt removal to hospital is the first indication after a fit has occurred.*

It should, I think, be recognized that a case of eclampsia calls for hospital resources as urgently as the most serious surgical operation. The general requirements of the case are:

1. A darkened quiet room.
2. Continuous supervision by at least two trained nurses.
3. Careful attention to the condition of the respiratory passages, as the throat and nasopharynx are apt to become blocked during the convulsive seizures.
4. A well-regulated supply of fresh air, with oxygen in reserve if required.
5. The continuous assistance of a clinical laboratory, and expert medical superintendence always available.

It is clear, I think, that, generally speaking, such requirements can only be met in hospital.

The case of eclampsia which occurs in a remote country district is indeed a tragedy; it can only be met by the provision of proper facilities for transport by ambulance as part of the public health organization of every county.

III. *Cases of eclampsia vary greatly in severity, and a simple classification of cases as mild or severe would greatly facilitate treatment.*

An approximate estimate of the gravity of any case can be readily made in a short time by observation of the following points:

1. The amount of albumin in the urine (catheter).
2. The number and frequency of the fits.
3. The mental condition of the patient.

The reports to which I have previously referred showed that by observation of these points cases can be grouped as "mild" or "severe." The case is a *severe* one if the urine solidifies on boiling, if the total number of fits exceeds ten, and if there is continuous coma of any degree. The case is a *mild* one if the amount of albumin is moderate, if the fits are few and infrequent, and if the patient's mind is clear between the fits. The reports further showed that two-fifths of the cases investigated were severe, and that the mortality of the severe cases was five times as great as those which were regarded as mild, the percentages being 6.5 and 32.4 respectively. This marked difference in the mortality of the two groups is of course a demonstration of the accuracy of the method of classification.

It will be clear that mortality figures from any given centre may be greatly influenced in either direction by an undue proportion of severe cases or of mild cases. The suggestion has been frequently made that the remarkably good results reported by Stroganoff from Russia may be explained by the fact that the disease in that country may assume a milder type than in Great Britain. It is almost impossible to compare results from different centres unless the cases are classified on some plan or other. Further, the value of any particular methods of treatment can be estimated much more accurately if their effects are viewed in the light of the degree of severity of the cases treated. It therefore appears clear that our records should in future always include classification of cases upon some such plan as I have outlined.

IV. *All cases of eclampsia are best treated by the minimum of obstetric interference.*

This should be limited to induction if labour does not come on spontaneously, and termination of the second stage by low forceps when the head has descended to the perineum.

Referring again to the reports previously mentioned we find that cases delivered (*a*) naturally, (*b*) by induction, or (*c*) by low forceps showed a much lower mortality than those delivered by rapid methods such as Caesarean section or accouchement forcé. The greater number of cases of accouchement forcé in the reports were cases in which manual dilatation of the cervix had been carried out in order to expedite delivery; in very few cases was instrumental dilatation practised.

In making this comparison it must not be overlooked that the cases in which a major obstetric operation was deemed necessary may have been of a more severe degree than the others, and would therefore be likely to show a high mortality on that account. This fallacy can be to a great extent eliminated if the cases are first divided into the two groups "mild" and "severe" on the basis which I have just described. I want, therefore, to ask your attention to the following simple figures taken from the reports.

Four hundred and twenty-five cases were analysed and classified into the two groups mentioned above.

Of the *mild* cases 209 were delivered either (*a*) naturally, (*b*) by induction without subsequent assistance, or (*c*) by low forceps or version; these cases showed a mortality of 5.2 per cent. Further, 51 mild cases were delivered by Caesarean section, with a mortality of 9.8 per cent.; 40 mild cases were delivered by accouchement forcé, with a mortality of 25 per cent.

Of the *severe* cases 114 were delivered either (*a*) naturally, (*b*) by induction without subsequent interference, or (*c*) by low forceps or version; these cases showed a mortality of 26.3 per cent. Further, 37 severe cases were delivered by Caesarean section, with a mortality of 43.2 per cent.; 10 severe cases were delivered by accouchement forcé, with a mortality of 60 per cent.

I do not think that any words of mine can convey more than these simple figures. Cases treated by the "expectant" obstetric methods showed much the best results. Delivery by rapid dilatation of the cervix is clearly an unjustifiable procedure, and must in future be totally excluded. Cases delivered by Caesarean section, whether mild cases or severe cases, show a mortality nearly double the mortality of those of the same class delivered naturally or by simple obstetric measures.

V. *Simple medical treatment carefully regulated and constantly watched gives the best results.*

In respect of medical treatment our leaders are Stroganoff and Hastings Tweedy. The treatment of Stroganoff I have already outlined, and have remarked upon the remarkable success achieved by it both in his own hands and in the hands of others. Hastings Tweedy's conception is on similar lines, but differs in that he deprives the patient absolutely of all food except water and that he takes great pains to clear the stomach and colon of their contents and to keep them empty. I must not stop to discuss the theoretical consideration upon which Tweedy's treatment of the alimentary canal is based,

or I shall exceed the limits of time allowed me. The forthcoming number of the *Journal of Obstetrics and Gynaecology* will give it fully.

The methods of treatment which will always be associated with these two honoured names have the great virtue of simplicity of conception and of detail, which allows of its being set going without delay in any simply equipped hospital or institution. In my opinion, the crying need of the moment is for the simplification of the medical treatment of this disease and its organization upon a definite plan which can be easily followed.

The London committee which reported to the British congress on 547 cases treated in various London hospitals were greatly struck by the indiscriminate manner in which varied, and sometimes mutually antagonistic, methods of treatment had been often carried out in a single case. Many patients, they say in their report, "were subjected to a multiplicity of drugs, and to a succession of drastic procedures, such as might be expected to reduce a parturient woman in good health almost to the point of death." A certain number of cases were subjected in succession to treatment by purgation, venesection, intravenous saline, morphine, hot packs, and veratrone, besides being delivered by Caesarean section or accouchement forcé; in these cases it appears that excessive treatment may have been largely responsible for any fatal results which occurred.

The Dublin method is based upon the following points:

1. Constant supervision of the patient by a doctor or an experienced nurse, in a quiet darkened room.
2. Complete deprivation of all food except water; to a comatose patient nothing whatever, even water, should be given by the mouth.
3. Stomach lavage to empty that viscus and clear it.
4. Colon lavage for the same purpose, repeated as required to keep the colon empty. Great importance is attached by Dublin to this point; very thorough lavage is practised, several gallons of fluid being run in and out through a long tube, the procedure sometimes occupying as much as an hour and a half.
5. Purgation by salines administered both by stomach and colon.
6. No obstetric procedure whatever until labour is near the end of the second stage.
7. Administration of morphine in total doses of 1/2 grain to 1½ grains.

The present master of the Rotunda, Dr. Gibbon Fitzgibbon, has slightly varied this treatment by the omission of the morphine. Treatment on these lines is now generally carried out in Ireland, and the excellent results achieved I have already referred to.

In my opinion the general adoption of the principles of treatment advocated by Stroganoff and Hastings Tweedy would result in an immediate reduction of the mortality of this disease and the consequent saving of many valuable lives. I am not, however, prepared to say that the Dublin method is the last word that can be spoken on the subject. It is without doubt the only treatment required for cases which can be classified as mild. Further clinical inquiry is, however, needed, and will, I believe, be undertaken without delay at the instance of the British Congress of Obstetrics and Gynaecology, to determine whether, taking the Dublin method as the basis of treatment, better results could not be obtained in severe cases by associating with it other procedures. For example, cases not in labour may do better if immediate induction of labour were combined with Dublin treatment; cases associated with high blood pressure may do better if veratrone were combined with the Dublin treatment; cases with numerous fits may do better if some narcotic—not necessarily morphine—were combined with the Dublin treatment.

I have put these propositions in a form which will, I hope, make discussion easy, for I very much want to know how far they will prove acceptable to this Section. Complete unanimity we can never get, and in my opinion we do not want it, for it spells stagnation; but the hopeful feature of the moment is that there now appears to be a prospect of order replacing chaos. Obstetric teachers are working together on this subject and are proceeding upon co-ordinated lines. If a simple logical scheme of treatment could be put forward and backed by something like the united opinion of British and Irish obstetric teachers it would, I am sure, be welcomed by the profession and would be of the greatest public service.

DISCUSSION.

The President said that consultants were constantly being asked what was being done in the treatment of eclampsia. No subject had impressed him as one in charge of hospital beds with such a sense of responsibility as this one. He hoped that much good might result from the combined investigation which was to be carried out.

Dr. Campbell (Belfast) said that, in regard to prophylaxis, no one denied its advantages, but the difficulty was to get women to come for examination. Women must be educated into doing this. The great success of the Dublin treatment justified its continuance. A very close modification could be carried out in a private house. He felt in doubt about those cases whose severity was so great that he was tempted to rupture the membranes—this addition would probably not be approved by Dr. Tweedy—but he thought that the decreased volume of the uterus might give the patient a better chance.

Dr. Douglas (Cupar) agreed with the great importance of prophylaxis. More than thirty-five years had elapsed since his first and only fatal case. From that time he had treated strictly every case of albuminuria, and he had only seen two cases of eclampsia in his practice since. These cases had impressed him with the immense importance of testing the urine in every case and where albumin was present starting treatment at once.

Professor Louise McIlroy (London) wished to raise three points: (1) the enormous number of cases, (2) the ineffectiveness of treatment, (3) that prevention was the only treatment. That the intestine was to blame could be seen from the success of the Dublin treatment. Epigastric pain might be regarded as a constant sign; this was not due to the stomach but to the liver, probably the result of a *B. coli* infection. Ante-natal beds and out-patient department should be compulsory in every hospital. She considered the treatment of diseased teeth of great importance. She had had no case of eclampsia among those who had received ante-natal treatment. She was very keen on injections into the bowel of sodium bicarbonate by means of a douche can fitted with rectal nozzle, the fluid being delivered very slowly. She considered that induction of labour was a very dangerous thing, as an enormous quantity of toxic substances was going to be poured into the blood stream. She condemned drug treatment whole-heartedly.

Dr. Lapthorn Smith (London) thought that every case of eclampsia could be saved by prevention. He had not seen a fatal case for thirty years. Women would not come to their doctor unless the doctors made them come. If the urine were carefully examined and treatment commenced without delay there should be no difficulty in bringing a patient through without convulsions. He considered that sodium bicarbonate was the most valuable drug without the slightest doubt. Piles and vomiting might be ascribed to the same common cause—intestinal intoxication. He recommended the cutting off of all nitrogenous food and he emphasized very strongly the importance of making pregnant women drink plain water in sufficient quantity. When convulsions had come on he considered morphine was then the most valuable drug. Morphine did not suppress the renal function, as used to be taught—it aided it. He would like to see the use of chloral prohibited. He was against the induction of labour as it might give rise to considerable shock; on the contrary, he would advocate Caesarean section.

Dr. Laurie (Greenock) said that undoubtedly cases with considerable albuminuria responded well to treatment, but many women refused to come into hospital. He had had five cases with complete coma, suppression of urine, almost constant convulsions, total blindness, and anasarca. He had done Caesarean section and all had recovered. Operation in such cases appeared to be the only thing left to do. He said that he was a great believer in butter milk and large saline enemata for patients with albuminuria.

Dr. Russell Andrews (London) quoted the wise old physician who said, "Let your patients die if they must, but don't kill them." He was delighted with Dr. Eden's advocacy of simple methods. These cases had been overtreated. He was certain that morphine had killed many patients. Injections of saline had been overdone to an absurd degree—at *post-mortem* examination all the serous cavities had been

found full of fluid. Croton oil had been found in the bronchi. The combined investigation held out very great hope for the future. A proper classification of cases would avoid the application of *all* treatments to one case.

Dr. BALLANTYNE (Edinburgh) made three points: (1) eclampsia was intractable but preventable; (2) as regards the child the outlook in eclampsia was bad; (3) preventive treatment was amazingly successful, but it was of necessity very difficult to state results.

Professor MUNRO KERR (Glasgow) stated that he had been informed that treatment in France was on the same lines as advocated by Dr. Eden. He could not agree that prognosis should be based on the quantity of albumin; the most toxic cases often had only very slight albuminuria. He still considered that in certain cases Caesarean section was the only resource, but the difficulty was to select these cases. He thought there was too much operating at present.

Mr. FARQUHAR MURRAY (Newcastle) strongly endorsed all that had been said in regard to prophylaxis, especially in connexion with the teeth and the intestine. Proper care of the bowels would reduce these cases to less alarming proportions. He did not give the patients at his clinic a list of warning signs, but instructed them to report at once if they felt a little out of sorts: he regarded this as good an indication as the urine for pointing the need for careful supervision.

Dr. LEWIS asked what precautions might be taken to give advice on this subject to midwives. The only cases he had seen during the last four or five years were cases attended by midwives. He did not think they tested the urine nor appreciated fully the importance of the routine examination. They should be taught to do so.

Dr. EDEN, in closing the discussion, agreed that midwives needed better instruction and should work in closer co-operation with the doctor. *Post-partum* fits should be treated by the Dublin method just the same as the *ante-partum* cases. As regards intestinal intoxication he found on looking through the figures that in the two war years, when the food shortage was most acutely felt, the ratio of eclampsias fell considerably. Had the food shortage anything to do with this? In regard to Caesarean section he felt that the easiest way was not always the safest way. But his mind was quite open on the subject, and when Professor Munro Kerr had told him in what cases to do Caesarean section he would do it. He had purposely omitted references to the effect of eclampsia on the child, for the sake of brevity.

THE TREATMENT OF GYNAECOLOGICAL CONDITIONS BY X RAYS AND RADIUM.

BY

ROBERT KNOX, M.D.EDIN.,

Director of the Electrical and Radiotherapeutic Department, Cancer Hospital; Honorary Radiologist, King's College Hospital.

IN introducing the subject for discussion it is well to state at the outset that so far as effects are concerned either *x* rays or radium may be useful, and that in certain cases the use of the two agents in combination is an advantage.

In dealing with the general question of radiation treatment it will simplify the matter if we assume that the potency of the radiation employed is the important point, and that it makes very little difference whether the radiation is produced by an *x*-ray apparatus or a quantity of radium. It is essential to ensure that the area treated gets a dose of sufficient intensity to produce the changes necessary for the cure or relief of the condition. The technique of the application is therefore an important step in the treatment. The estimation of the dose is another most important step, and that necessitates expert knowledge of apparatus, physics, and the biological reaction of the tissues.

The dose is determined by physical means; the measurement of the radiation from an *x*-ray tube or from a quantity of radium is now a fairly precise procedure, and one upon which absolute reliance may be placed. Elaborate instruments are used for the purpose, both in the laboratory and in the treatment rooms. Thus it is possible to calibrate the *x*-ray tubes and the radium applicator and determine what dose is given from each in a given time.

Later methods indicate that if the radiations could be described in relation to its wave length it would simplify dosage very considerably. For instance, in the electromagnetic spectrum about sixteen octaves are occupied by the *x* rays and the gamma rays of radium. Of these so far only three or four octaves have been used. The voltages required to produce the available wave lengths vary enormously. The *x*-ray value used for the intensive treatment of uterine conditions runs in the region of 200,000 to 250,000 volts, while the most penetrating gamma ray from radium approximates to 1,000,000 or more. So for practical purposes if *x* rays and radium rays are available, a range of wave lengths from 200,000 to 1,000,000 volts is available for the treatment of the conditions met with in gynaecological practice.

In deep therapy it is necessary to know exactly what percentage of a beam of rays will reach a certain depth, and what percentage of the arriving beam will be absorbed by the tissues. The determination of this factor is a purely physical problem, and the experimental results are readily obtained. Precise instruments again help us in the examination.

The third step is to determine what takes place when the radiation reaches the tissues, and what the effects upon the metabolism of the cells may be after absorption. It is known that secondary rays are produced by the primary ray acting upon the tissues, and the scattering of the rays is an added factor to which great importance must be given. These have a marked effect upon cellular structures, and the degrees of susceptibility of varying cells have been worked out as a result of experience in treatment. So on the one hand we have the wave length of the radiation as a physical factor capable of precise measurement, and on the other the varying susceptibility of the cellular structure of the tissues. Future measurements of effect may be worked out on these two main lines, and it may be possible to select the wave lengths which will have the maximum effect upon a particular type of cell of which the main part of a tumour consists.

In the treatment of fibromyoma, for example, the action of the rays appears to be exerted primarily on the ovary and its blood supply, suppression of function leading to atrophy of the structure and cessation of the menstrual haemorrhage. The latter is the most troublesome symptom arising from fibromyoma, and the improvement of the patient's health may in fact be attributed to its cessation. The atrophy of the ovaries is, however, accompanied in a number of cases by a diminution in the size of the tumour. It is reasonable to assume that an action is exercised upon the tumour itself. It is therefore advisable, when treating the ovarian areas, also to include the tumour. The tube is arranged in treating each area so that the beam of rays may be focused upon a given spot. If each ovary gets the maximum effect from each of those ports of entry on the side on which it lies, the tumour also receives a very large proportion of the radiations passing through it, and changes occur in its structure.

Whatever the action may be and upon whatever structure the rays act most, there is no doubt whatever that in the treatment of those conditions many marked beneficial results can be obtained by carefully applied courses of radiations.

Biological Reaction.

The biological response to radiations has been worked out in several centres, notably in Germany, by Seitz and Wintz, and by Kronig and Freidrich. It is obtained by multiplying the physical dose by the sensitive coefficient of the tissue affected. It depends upon the sensitiveness of the absorbing medium, and according to a number of observers it varies with different histological structures. Muscle reacts differently from skin, carcinoma cells differently from ovarian cells, and these again differently from the cells of a sarcoma. In 1916 the writer published details of observations on the response of enlarged glands to definite doses of radiation. The results then given conform in the main with the observations of workers in Germany.

To obtain a uniform method of dosage Seitz and Wintz introduced the term "unit skin dose," together with a biological system of measurement. This unit skin dose is obtained under definite physical conditions, and they state that the normal skin can be used quite well as a biological

test object. By unit skin dose (U.S.D.) Seitz and Wintz mean that amount of radiation which after eight days will cause a slight erythema, and after four weeks a slight tanning of the skin. On the basis of this definition, which they have placed at the arbitrary figure of 100, they have determined other doses, constituting their biological system of measurement. The figures quoted are from their work, and in all of them the unit skin dose forms the basis. The following figures are given to illustrate the points:

(1) Unit skin dose	100 %
(2) Castration dose	35 % of U.S.D.
(3) Sarcoma dose	60–70 % of U.S.D.
(4) Carcinoma dose	90–110 % of U.S.D.
(5) Intestinal dose	135 % of U.S.D.
(6) Muscle dose	180 % of U.S.D.
(7) Tuberculosis dose	50 % of U.S.D.

It is assumed in these figures that, if the uniform skin dose is taken as 100, 35 per cent. of such a dose reaching the ovaries will in time induce amenorrhoea of a permanent character; 60 to 70 per cent. reaching a tumour will lead to changes in it, if it is chiefly composed of sarcomatous elements; 90 to 110 per cent. will induce similar changes in a carcinoma; 135 per cent. is the dose which will injure the bowel; 180 per cent. the muscles; and 50 per cent. of the erythema dose will react favourably upon tuberculous conditions.

It would be well not to place too implicit faith in the accuracy of these observations. The response will be by no means invariable, because there are other factors, of which no notice is taken, which will permanently change the character of the response—for example, a carcinoma will react at one period of its life history while at a later it may refuse to respond at all, and so on.

As indicated, it may be well to resort to radium instead of *x* rays when the type of tumour requiring treatment is one which indicates a value in wave lengths well beyond the limit of the *x* radiations at our command. It is for this reason that the combined use of the two agents is advocated in a number of cases of deep-seated carcinoma. Radium can be applied to the interior of hollow organs, and the dose administered with a precision that is almost impossible under present *x*-ray conditions.

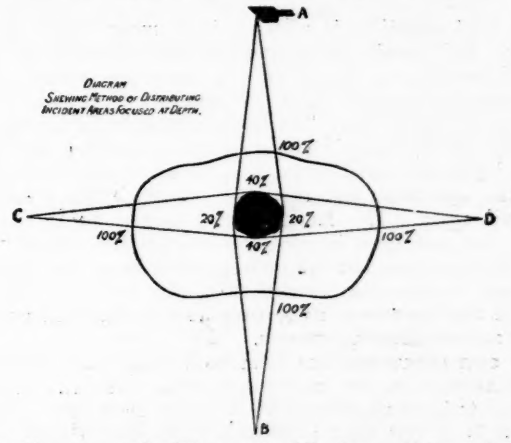
It is most important that due consideration should be given to the technique to be adopted for the treatment of one or other of the graver forms of pelvic disease. It is clear that if we could select a particular wave length for use, the apparatus which in the case of *x* rays supplies the high tension current should be so graded that any voltage within reasonable limits could be obtained. In the treatment of fibromyoma and carcinoma of the uterus the technique has been clearly worked out in the German and other schools, and is now being generally adopted in this country. *X*-ray tubes capable of long runs at high voltages are now procurable, and it is even possible to administer what is known as the sterilization or the cancer dose at one sitting. It may be pointed out that this is not invariably so, for it is frequently necessary to repeat the dose after an interval of several weeks. Whatever the accuracy of the statement may be it indicates an advance, and an attempt to standardize technique.

The important point is that when the correct dose has been given for the condition requiring treatment changes are set in action which in a percentage of cases yield effects which are curative. The old and better known techniques do not aim at such a rapid effect; these have in a number of cases given quite satisfactory results, and are still in the main adhered to. It is probable, however, that in the future the tendency will be to increase the initial dose and depend more upon it for the attainment of results. It is also probable that a modification of the newer technique may be advisable. These remarks apply mainly to the *x*-ray technique. Radium is being used more frequently than in the past, and it is more than likely that a great improvement in the technical use of radium will lead to an improvement in the results.

The radium technique is very simple. It consists of the use of radium salts in small tubes; filtration is employed according to the effect it is desired to obtain. Metal filters of silver, lead, brass, or platinum are used. Radium is most conveniently used for the deep-seated lesions, when the tubes can be introduced into the interior of an organ, or when the tumour is within reach, when radium tubes may be inserted into the substance of the growth.

The treatment of a case of carcinoma of the uterus calls for expert knowledge, and a careful operation under an anaesthetic is often required for its execution. Care must be taken to protect the surrounding tissues from damage by overexposure. The use of radium is advocated for all uterine carcinomata after the method described. The best results are obtained by the combined treatment. When radium is used the field of action is somewhat localized, the intensity diminishing in inverse ratio to the square of the distance of the object from the source of the radiation. After 3 cm. of tissue the effect is very small. *X* rays may be administered from several aspects of the periphery, centring the beam upon the tumour. In this way extensions of the malignant disease by way of the lymphatics may be prevented. It is therefore logical to assume that in the combined attack we are doing the best possible for the patient.

The *x* rays can be applied through large areas and from several entrances; in this way a large dose may be concentrated on a lesion in a deep region of the body. An example of malignant disease of a pelvic organ may be taken to explain how the dose is administered. If the growth is situated in the mid region between the anterior and posterior walls of the pelvis it can be approached from four aspects, thus:



Four skin areas receive 100 per cent. of the dose. At the seat of the tumours A and B de'iver each 40 per cent. = 80 per cent.; C and D each deliver 20 per cent. = 40 per cent.; 80 + 40 = 120 per cent.

Using a beam of radiation of which 40 per cent. will reach and be absorbed by the tumour, then from the anterior and the posterior aspects 80 per cent. of the U.S.D. will be given; that is not enough, so from each of the lateral aspects a dose is given of which 20 per cent. will be absorbed by the tumour. We now have 40+40+20+20=120 per cent. of the U.S.D.—that is, just 20 per cent. over the estimate of 100 per cent. as the lethal dose.

The *x* rays cover a large area and so enable us to treat not only the tumour but its whole area of lymphatic drainage. Experience has taught that in all cases of cancer it is essential that the lymphatic field should be treated to as heavy doses as the primary tumour receives. In this way it is hoped that metastasis will be prevented. Should cancer cells exist in a region some distance from the primary growth they must be removed either by operation or by radiation treatment, if a recrudescence of the disease at a later date is to be prevented. The aim of operative and radiation treatment has been to prevent such an occurrence; in consequence of this operative measures have become more extensive in the area operated upon; similarly, the tendency is to increase the field of irradiation and also the intensity of the radiation.

It is probable that in the operative results improvements in the statistics may be attributed in part to the better appreciation of the extensive field of invasion and its complete removal. Radiation results have also improved since the larger dosage and wider fields of irradiation have been employed. Statistics whose object is to prove the value of the radiation methods are therefore very difficult, and it may be that a long time must elapse before any definite conclusion can be drawn from them. A comparison of statistics giving operative and radiation figures is also very fallacious, because of the difficulties associated with the facts submitted. Attempts are made to compare statistics on operative and radiation cases chiefly for the purpose of proving that the latter give as

good results as, if not better than, the operative; impartial critics are inclined to favour the operative, and if this be so it is perhaps only reasonable to proceed a little further and consider the other points of comparison between the methods.

The newer methods, and particularly that known as the "Erlangen" method, involve a considerable strain upon the patient; briefly, the whole treatment occupies in the first instance seven or eight hours of continuous radiation. In the Erlangen technique the radiation treatment is preceded by a prolonged ionization of the local tumour. This constitutes the first treatment; it is followed at an interval of about six weeks by another long dose, and at a still later period by the third series of irradiations. In all a period of three months will elapse before the treatment is completed. It is possible that with improvements in apparatus and increased output the time required for the dosage will be materially shortened; when it is possible to reduce the time of irradiation to about two hours the strain upon the patient will be lessened.

When compared with the operative method it is not nearly so rapid in the attainment of the result—that is, the removal of the tumour. The drain on the system is not so sudden, but it may be more severe, and any depreciation in the blood constituents may be a serious factor in the progress of the cure.

The next question is whether it is more complete in its results. Is it possible to remove not only the primary growth but all possible extensions of it? In other words, can the *x*-ray method compare with the surgical so far as complete removal is concerned? The answer must be in the negative. Statistics of Wertheim's operation are available; the percentage of persons cured after, say, three years varies greatly with the operation and the stage at which the disease was operated upon. The Roentgen Wertheim, as it has been called, has not been in use long enough for reliable figures to be forthcoming, but the figures which have been published on *x*-ray treatment in carcinoma of the cervix on the older lines do not encourage us to support the claims in favour of *x* rays against those of surgery.

Our own experience has been such that in all cases which are suitable for surgery we strongly recommend it. It is well, however, to insist upon prophylactic *x*-ray or radium treatment, because it is felt that combined treatment is best for the patient. When the condition is considered to be inoperable there is no choice. Radiations should be employed in all cases; then it becomes a question of the best technique to employ. Radium and *x* rays in combination are placed next to surgery in the treatment of all malignant diseases of the pelvic organs. Radium is used internally whenever possible, and *x* rays from the periphery inwards to a central point, which is somewhere near the centre of the tumour. Tubes containing radium or its emanations with suitable filters are introduced into the canal, and other tubes or needles are pushed into the tumour mass. Radium used in this way has a very limited but concentrated action. Care should be taken to place the tubes within 3 cm. of each other, and the whole of the tumour should be pierced by these needles, the aim being to get a maximum and uniform irradiation of the whole of the tumour mass. Careful packing around the tubes is required to prevent the adjoining structures from receiving damage.

The lymphatic field, whose centre is the tumour mass, must now be very thoroughly irradiated from the periphery of the body towards the centre whose area includes the tumour. As many as six ports of entry from the anterior aspect are used. Similarly several areas from the posterior aspect may be used. The aim here is to thoroughly saturate the tumour with radiations and to induce changes which will destroy any cancer cells, or at least render them inert. Very large doses may be required to do this thoroughly; it demands very careful technique.

In carcinoma of the body of the uterus operation is the first choice; in carcinoma arising in the cervix the claims of radium must be seriously considered. The use of *x* rays in this connexion is not certain enough to warrant the consideration of *x* rays in preference to radium. With a sufficient quantity of radium the dose could be shortened to endurable limits. The *x* rays are used from the periphery. This, in our opinion, is the best routine to follow, and offers in suitable cases a prospect almost as good as does the complete operation.

Pre-operative treatment by *x* rays is not advocated in cases which are going to be operated upon (unless for some other reason the operation is delayed), because if *x* rays are to be useful the dosage must be a maximum one, and the area covered must include all possible lines of extension from the primary lesion. The administration of the cancer dose involves a large surface of irradiation, and serious constitutional symptoms may arise; these if severe and supervening upon operation might jeopardize life, and at a later stage the effect on the blood might so weaken the patient's power of resistance that convalescence from the operation would be retarded.

The advances in technique have changed the view regarding pre-operative treatment; it is indicated that the choice must be made as early as possible between the operative and the radiation treatment.

It would be well in considering the relative values of *x* rays and radium to understand clearly that no antagonism exists; the one can be and frequently is supplementary to the other, the controlling factor being the ease with which one or the other can be used. It may be admitted that if an equal dose from either is administered the effect upon the tissues will be the same. The difficulty with radium is to get a sufficiently large quantity to ensure an equal distribution of the rays over a large tumour. A large number of tubes may be required to thoroughly irradiate a tumour mass; and it may be necessary in such cases to perform an extensive operation in order to get the tubes in position. It might be possible in such cases to saturate the tissues thoroughly by the use of *x* rays, and with the shorter wave lengths coming into use it will be possible to do this, even when a tumour is situated in the interior of the body.

Another factor of some importance is the response of the tissues to the radiation. Some may only require a large quantity of relatively long wave lengths, while in others the shortest wave length of the gamma rays of radium may be more suitable.

The critical test of the value of radiations in practice will be the results obtained in the treatment of malignant disease. All forms of malignancy will come under consideration, and differences of opinion will find expression according to the type of disease, the stage at which it is treated, and the technique employed. So far the evidence is in favour of a combined attack by the surgeon and the radiologist in malignant disease; the advantage of collaboration is well recognized. In non-malignant disease of the pelvic organs the same observation holds with even more force.

The final word on the value of the treatment of uterine fibroids by *x* rays will rest largely with the gynaecologist, but the radiologist who pays attention to the clinical aspect of the case and remains in touch with the patient will also attain a proficiency in the estimation of particular values. The medical man in direct charge of the patient is, however, frequently as competent to judge as either the radiologist or the gynaecologist, and he is indeed the best judge of the after-results of all treatment because of his more intimate association with the patient.

All cases of fibroid enlargement of the uterus or of malignant disease where radiation treatment is proposed should be examined by a gynaecologist, who will report on the condition and express an opinion of the suitability of the case for this treatment. In this way a judicious selection of cases will be ensured, and the value of the method be estimated. The converse also holds good: no case should be treated by radiations by anyone who is not an expert radiologist. The time is fast approaching when gynaecologists will adopt *x*-ray treatment as a valuable adjunct, and it is imperative that they should take steps to become thoroughly familiar with the intricate subject of radiotherapy. Personally I have treated all cases in close touch with a gynaecologist, and it has also been my practice to send back to the gynaecologist all cases on completion of treatment for a final opinion; and also, for further advice, all cases which have failed to respond.

An illustration of the value of such collaboration is the case of a patient who was sent for *x*-ray treatment of menorrhagia which was supposed to be due to the presence of a fibroid. My request for an expert gynaecologist's opinion was refused by the patient, so I reluctantly undertook to give her a number of exposures. The result was not satisfactory, and, as I suspected from her symptoms that I was dealing with a mucous

polypus, I insisted upon the expert opinion. The patient was examined, the opinion confirmed, and surgical treatment relieved the condition.

On another occasion, symptoms having arisen which called for an examination of the blood, the opinion of the clinical pathologist led to the services of a physician being called in.

A lady of middle age had suffered from exophthalmic goitre, and as a result of treatment at a health resort had improved, but had not quite recovered. Later she experienced severe floodings and consulted a gynaecologist, who treated her for some time; the haemorrhage, however, became more severe, and she was sent for *x*-ray treatment. The case was a complicated one to deal with, but under the circumstances I felt justified in treating her. The response to treatment was good at first, but in the middle period between the doses she began to show alarming symptoms. Before giving her a heavy dose which was expected to effect a cure of the haemorrhage I asked for a full blood count. The white cells were very low in number, so I determined to suspend *x*-ray treatment for a time and handed her over to a physician. A course of tonics combined with rest proved very successful—the blood count showed a marked improvement. The haemorrhage ceased for several months, and the general health improved greatly. When last communicated with the patient was in perfect health.

The lesson taught by this case is very important. In serious cases it is always well to control treatment by blood counts at regular intervals. Serious accidents will thus be avoided, and the radiologist will have a valuable guide for modification of technique. A drop in the total number of white cells is always an indication that treatment must be suspended or very cautiously continued. It will also be a guide for the actual dosage. Had I persisted in the case quoted and given the very large dose I had intended I have no doubt that I should soon have reduced the white cells to the danger point and would undoubtedly have seriously injured the patient. The need for complete and frequent blood examinations is much more imperative since the very intensive dosage has been adopted.

Contraindications to Treatment by X Rays (or Radium).

There are certain conditions which if coexistent are direct contraindications to radiation treatment—in fibromyoma, for example.

1. It is obvious that if a large portion of the fibroid has become converted into calcareous matter, and if the tumour is of large size, *x* rays can have no beneficial effect. In doubtful cases a radiographic examination will reveal the extent of the degenerative change.

2. Most forms of degeneration should be excluded before *x* rays are administered, though, if not very extensive, the treatment may be tried.

3. Malignant disease of the uterus calls for very careful consideration. Operative measures should be discussed. If it is impossible to remove the tumour, then there is no objection to a combined attack on the disease by *x* rays and radium. Very careful application of radium tubes is necessary, and for this a general anaesthetic is indicated.

4. Infective conditions of the uterus complicating fibroids.

5. Suppurative salpingitis or pelvic peritonitis.

6. Inflammatory conditions of other organs in the vicinity—namely, appendicitis, cystitis, etc.—should be dealt with before attempting to treat the fibroid.

7. Submucous pedunculated fibroids.

Advantages and Disadvantages of X-ray Treatment.

The advantages are:

1. The treatment is quite painless, and any ill effects are quite temporary.

2. The patient can live her ordinary life, merely arranging for one or two days of rest after each treatment.

3. No elaborate preparations are required.

4. The resulting menopause is not usually attended by such severe nervous disturbances as those following operation.

5. In patients whose general health is much impaired the recovery is very rapid when the haemorrhage has been arrested; moreover, the shock so often inseparable from hysterectomy is entirely obviated.

The disadvantages are:

1. It takes a considerable time to effect a result; treatments may have to be given at intervals for several months. The use of the more penetrating radiation and the larger dose indicate that the time taken to produce the effect will be greatly shortened. If the correct dose is given the changes may be induced by one application.

2. The treatment is not invariably successful.

3. The tumour, though as a rule much reduced in size, does not entirely disappear.

4. Treatment may cause unfavourable changes in the blood.

Dangers of X-ray Treatment.

Indiscriminate treatment by *x* rays is very dangerous. The skin may be seriously damaged and severe burns induced. In one case—that of a patient who was treated for a supposed malignant growth of the pancreas for over a year—there was when I saw her a large, fairly deep *x*-ray ulcer, and around it a large area of inflammatory reaction. I watched the ulcer for over a year and only used palliative applications. In about eighteen months it healed. An accident such as this is avoidable and should never occur in cases where the technique is intelligently carried on.

The dangers incidental to the action of the radiation on the deeply situated organs and tissues have been referred to in the consideration of the biological factor. The blood may be prejudicially affected by the larger dose now in use. It must be carefully watched during the periods between the doses, and any severe fall in the number of the white cells is an indication for the suspension of treatment.

Overdosage to the deeper structures may at a later date give rise to serious disturbance of function. It must not be forgotten that there are such occurrences as late manifestations of *x*-ray effects; these may take on a variety of forms, and may show after an interval of many months or even years.

DISCUSSION.

The PRESIDENT wished to thank Dr. Knox for a very sane exposition of the subject. Too often methods of treatment were spoken of in superlative terms, and failures were relegated to a small footnote. He thought that the profession should be on its guard in accepting so-called evidence of cure in cases of malignant disease; such cases should be subjected to the most rigid tests. Quite extraordinary results had occurred in cases of what was apparently malignant disease completely clearing up after simple curettage. Similarly, in fibroids some cases made remarkable steps towards recovery by themselves, so that it was necessary for any form of treatment to be subjected to searching tests before definite claims were put forward for it.

Dr. KATHARINE CHAPMAN (Glasgow) asked for a more full account of the contraindications to radiation treatment. For instance, it was said that submucous fibroids were generally regarded as unsuitable for this treatment. Again, it was said that *x* rays caused abdominal adhesions, but she had never yet found satisfactory evidence that they were not present before treatment was applied. She even thought that *x* rays might be applied for the treatment of adhesions, and cited a case in support of this view. She could not explain why patients improved so markedly when they were being sterilized. She had had cases of young girls suffering from pain, sickness, and haemorrhage who had shown marked improvement after the application of *x* rays.

Mr. CECIL ROWNTREE (London) said that he would feel somewhat diffident in addressing such an audience as a general surgeon but for the fact that at the Cancer Hospital many cases of carcinoma of the cervix were admitted, most of them inoperable. Carcinoma of the cervix could give a very useful test of the efficacy of *x*-ray and radium treatment, as the local growth usually killed the patient before there was time for the formation of metastases. For a long time he had been disappointed with the treatment, but his results had improved greatly during the past year as he had changed his method. He now always gave an anaesthetic and buried the radium in the substance of the tumour. With this method the local condition very greatly improved. He had often employed far larger doses than Dr. Knox had recommended, as the cases appeared to be so hopeless. In answer to questions, Mr. Rowntree said that he had not met with any case of vesico-vaginal fistula caused by burying radium, but he had had one case of fatal haemorrhage occurring on the

day after the patient left the hospital, and he now advised ligation of the internal iliac arteries as a precaution against such accidents in the future.

Professor Munro Kerr (Glasgow) wished to express his high appreciation of the manner in which Dr. Knox had presented his subject. Gynaecological surgeons owed a deep debt of gratitude to radiologists for the most valuable assistance they had given them in dealing with many affections which previously could not be so simply or so satisfactorily treated. As regards chronic metritis and fibrosis uteri in women approaching the menopause there was no doubt that *x* rays was a most valuable treatment. In a large number of cases so treated the results had been excellent. Some cases of extensive pelvic inflammation which were unsuitable for operation had been most satisfactorily treated in the electrical department of the Glasgow Royal Infirmary. He had had a few cases under his care of extensive tuberculous inflammation of the pelvis where on opening the abdomen operation was not considered advisable as adhesions of bowel were too extensive, and the danger of injuring the bowel almost certain—a very serious complication in such cases, which had proved very satisfactory when submitted to *x* ray treatment. When they came to fibromyomata there was the danger that *x* rays might be employed too freely, and as a matter of fact as far as pigmentation could prove this was the case. He thought that they had not yet fully exploited surgery; hysterectomy was too common; myomectomy had not yet attained its proper position. He felt that greater consideration should be given to this operation. The uterine cavity might be opened and an organ which appeared hopelessly diseased might even be restored to full function when hysterectomy appeared to be the only apparent treatment. Myomectomy should certainly receive more consideration than was being given to it at present. With regard to *x* rays, radium, etc., for carcinoma of the cervix Professor Munro Kerr had no fixed convictions. He employed radium prior to operation when it was procurable, and he believed that this treatment was of great value preparatory to hysterectomy, and it seemed to him that Erlangen treatment afterwards, say for three weeks, should be of great advantage, but so far he had employed this in only one case.

Dr. Arthur Burrows (Manchester) was very pleased to hear that Mr. Rowntree was getting better results from burying radium. In regard to the certain diagnosis of malignancy, he said that in Manchester sections were taken from all patients as a matter of routine. A certain number of chronic inflammations gave every indication of malignancy and diagnosis was sometimes exceedingly difficult. He did not wish to say much about carcinoma of the cervix. He thought that at present they were stationary, and progress would not be made until the radiologist began to treat operable cases. This he supposed must be a gradual process, but surgeons should draw the line of operability tighter, and those surgeons who did draw the line were the most pleased with the results of radiation treatment. The Erlangen results were nearly all obtained by the treatment of operable cases. The hopelessness of treating some cases by any means must be admitted. With a sufficient quantity of radium the outside of the pelvis could be bombarded as well as the inside. He considered that a combination of the two types of radiation was difficult and complicated, as the two types of rays had their lethal doses in different parts of the scale; hence present methods were markedly empirical. In regard to fibroids, *x*-ray treatment was not sufficiently certain to displace surgical methods, which were, on the whole, very satisfactory. He agreed with Dr. Knox that the effects of radium were often so good that it was difficult to conceive that removal of the ovaries could have done the same. He thought that the treatment of fibroids by radiation should be reserved for special cases: (1) when the general health would not permit of surgical interference; (2) for the relief of symptoms preparatory to operation; (3) where for business reasons it was not possible for the patient to spare the time to undergo operation and the subsequent period of convalescence. Dr. Burrows then went on to discuss some of the less talked about subjects. He had obtained one good result himself in a case of chorion-epithelioma. In regard to epithelioma of the vulva, he advised operation in early cases. His reasons were that treatment by external tubes and plates with the quantities of radium available was useless, while the best methods—namely, the use of unscreened emanation tubes or thinly screened tubes (that is, beta radiation)—caused an excessive reaction accompanied by considerable sepsis; hence the patient had to remain in hospital to receive proper nursing attention. In these cases he now applied diathermy first over the surface of the growth and then applied tubes—this procedure seemed to diminish pain. In some hopeless cases results were brilliant, but for operable cases operation was certainly far less painful. In the treatment of menorrhagia those cases which had already arrived at the menopause presented no difficulties, but in the bleeding of puberty and in young women the matter was much more difficult, owing to the alleged action of the rays on the ovaries; he was always reluctant to treat the latter type of case. He advised first curettage; hysterectomy was admittedly an abject confession of failure. If curettage failed to check the bleeding then exposure to a half-dose system, say 50 mg. in twenty-four hours, might prove successful, but it might fail. He did not think that the effect could all be ovarian as a number of cases had been quoted of patients who had borne children subsequent to the treatment. He had treated a few cases of bad dysmenorrhoea in a similar manner successfully.

Dr. Farquhar Murray (Newcastle) thought Dr. Knox's paper was scrupulously fair. He laid emphasis on the importance of full co-operation between the radiologist, the gynaecologist, and the pathologist. His experience of radium in cancer of the cervix had been most encouraging. Inoperable cases showed local improvement, and microscopic examination made in cases subsequently treated by the radical operation showed marked fibrosis of the cervix with degeneration and fibrosis of the cancer cells. This suggested the advisability of a routine pre- and post-operative radiation of the lymphatic field. He quoted two cases of complications following soon after radium treatment; one had a temporary hydronephrosis and the other intractable sciatica. He did not favour the *x*-ray treatment of fibroids. The great drawback to radiation treatment generally was that it was so very expensive.

Professor Louise McIlroy (London) asked whether Dr. Knox had any experience of *x*-ray treatment for menopause symptoms. As to fibroids, she was certain that they were the signs of a toxaemia; not infrequently the symptoms were not cured when the fibroids had been removed. She thought that in cancer post-operative radiation was the ideal rather than pre-operative radiation. Radiologists had not been given a fair chance as they had only been allowed to treat inoperable cases.

Dr. H. E. Gamlen (Newcastle) said that during the last fifteen years he had had a large experience in the treatment by *x* rays of diseases of the female generative organs, and by these methods he had attained successes which generally proved to be only temporary. Two years ago he had begun the treatment of some of these ailments by means of radium, using two tubes containing 100 mg. The method adopted was generally the laying of these tubes over the seat of the disease, duly filtered and protected, and some startling results ensued, and though afterwards he had found that some of these results were only temporary, yet in some cases he had been able to make operable malignant disease of the uterus which had previously been declared inoperable. Several successful operations had been performed as a result. Stimulated by the successes obtained by Dr. Arthur Burrows of Manchester, he obtained a further supply of radium amounting to 200 mg. of radium bromide made into seven needles. By means of these the growth and surrounding tissues were freely treated, and at the same time the protected tubes of radium were inserted into the uterus, with encouraging results. On reviewing the results obtained he decided to go a step farther, and in addition to treating uterine cases with large doses of radium he had given the whole areas affected deep therapy by the Erlangen method. He had found that he was able somewhat to reduce the dosage with less risk of giving the intervening healthy organs an excessive dose of deep therapy as he now finished the deep therapy within forty-eight hours, during which time the radium was in position in the uterus and surrounding areas. He was very hopeful that in some of these cases a knock-out blow would be given to the disease in question. In the later cases he had always ascertained the exact depth of the disease from the various fixed-skin areas for treatment by inserting a dense object in the growth and taking stereoscopic radiographs and measuring its depths. Up to the present all the cases under his treatment had been hopelessly inoperable, but the present results had been encouraging; many of the patients after treatment

had undergone operation in an attempt to eradicate the disease. Owing to the encouraging results they had obtained in chronic malignant disease of these organs, and the experience gained in the use of radium and deep therapy, he considered that the time had come when the surgeons should give them an opportunity of testing this treatment upon earlier cases, as he believed that if thoroughly carried out this treatment would finally give better results than surgery alone. To obtain the best results it was necessary that the work should be done in conjunction with the gynaecologist.

Dr. KNOX, in the course of his reply, said that he thoroughly agreed with the remarks of the President as to the absolute necessity of a high standard of efficiency in the diagnosis of malignant disease. He himself always tried to get a corroborative report in every case. He also relied on the nature of the response obtained by the radiations. He had at present under treatment a case which confirmed this: a patient with enlarged cervical glands with a definite diagnosis of malignancy gave such a remarkable response to treatment that he had questioned the diagnosis. He had obtained the slides upon which the pathologist had reported, and these, when submitted to several pathologists, were regarded by them as non-malignant and probably inflammatory. Yet on two other occasions this patient had returned within the last year, and on each occasion the response to several doses had been remarkable. In regard to practically all cases of fibroids and malignant disease 99 per cent. of the cases which he had treated had been sent to him by gynaecologists. He always acted in collaboration with his colleagues, and he generally left the question for and against treatment by radiation to be decided by them. He felt certain that team work was essential in all work of this kind; included in the team should be a skilled pathologist. By such means they might gain reliable information in regard to values. Then as to the treatment of fibroids: Submucous fibroids might do well; he could see no reason why they should not, providing they were not protruding through the cervical canal and pedunculated. He had had no experience in the treatment of pelvic adhesions. It might be that if a very large tumour were rapidly reduced in size adhesions might form if there was overdosage and peritonitis resulted therefrom. Speaking generally, radiations caused absorption of fibrous tissue in superficial lesions, so he could see no reason why it should not act as well in adhesions complicating fibroids. The good effects obtained during sterilization he had found constant in his cases; they were very noticeable. Dr. Knox said that he had only treated very few cases of haemorrhage in young girls. He thought the treatment would have to be done very carefully, shielding the ovaries and applying the dosage skilfully. He had seen fistulae occur after radium treatment, but he did not think that they were necessarily the direct result of the treatment. He thought that tying the internal iliacs was sometimes done with good results. In tuberculous disease of the abdomen he had not had much experience, but he had seen some encouraging results from *x* ray treatment, particularly in cases showing enlarged glands. He agreed with Dr. Burrows's observations. He was with the surgeon in the matter of fibroids. He was constantly placing surgery in the first place. In cancer operation was the first choice whenever possible, to be followed by intensive and extensive radiation either by *x* rays or by radium. He did not advocate pre-operative radiation as a very wide area would have to be involved, and that might expose the patient to further risk of spread. He was in agreement with Dr. Burrows about the treatment of epithelioma of the vulva. Certainly one of the greatest drawbacks to treatment by radiation was the great expense involved. He had had no experience of the treatment of ovarian carcinoma by radiation. He had not yet had time to make any observations on the intensive treatment of menopause symptoms.

Dr. C. D. LOCHRANE (Derby) asked Dr. Knox regarding his experience of the efficiency of radium emanation as compared with radium in treatment. He said that the larger cities in the country were generally fortunate in the possession of more or less large quantities of radium salts, but the same could not, unfortunately, be said of the smaller provincial hospitals. There had been a tendency in some quarters recently to discredit the efficiency of even the most carefully prepared emanation, but if the emanation were equally to be trusted the scope for the applicability of radium treatment in gynaecological and other cases throughout the country would be greatly extended. With regard to the prolonged and repeated application of *x* rays to the ovarian regions in the effort to control uterine haemorrhage the danger had not been emphasized of producing more or less serious damage to the blood cells. That this was a real danger had been recently demonstrated, and made one hesitate to recommend prolonged ovarian raying in cases apparently suitable for hysterectomy or myomectomy. He also asked what was Dr. Knox's experience of the effects of *x* rays on leucoplakia of the vulva. He had had no beneficial results in two recent cases of his own.

In answering the questions of the last speaker Dr. KNOX said that equally good results could be obtained from the use of emanations as from radium. He entirely agreed that in massive exposures the effect on the blood must be very carefully watched. Toxaemia might be produced if a very large dose were given. He agreed that the treatment of leucoplakia by radiation was very unsatisfactory.

THE TREATMENT OF SALPINGO-OÖPHORITIS.

BY

JOHN CAMPBELL, M.A., M.D., F.R.C.S.ENG.,

Surgeon to the Samaritan Hospital for Women, Belfast.

INFECTIONS of the Fallopian tubes have been classified as *ascending* and *descending*. Those of the ascending group are the most important and include inflammations started by agents, such as the gonococcus, the streptococci, and the staphylococci, which reach the tube by way of the vagina and uterus. The descending infections are due to organisms which are supposed to invade the tube from the bowel, the peritoneum, or the blood. They include the bacillus of tubercle and *Bacillus coli*. When you come face to face with a case of salpingo-oöphoritis, acute or chronic, it is impossible at present to make a clinical distinction between these two groups. Hence treatment must, as a rule, be considered in its broad general relation to inflammation, be the infective agent what it may.

There is such a sharp line of demarcation between acute and chronic inflammation of the tube and ovary that the treatment of the two varieties requires to be dealt with under separate headings.

I. ACUTE SALPINGO OÖPHORITIS.

Whatever the cause of this condition may be, it is still treated by the majority of gynaecologists on the expectant plan. Rest in bed until the temperature has been normal and the patient has been free from pain for a considerable time, laxatives, counter-irritation, and copious vaginal hot douching with saline solution or some weak antiseptic agent are the principal measures usually relied on. Morphine may be required to relieve pain. When there is purulent urethritis, or inflammation of Bartholin's glands, or other condition which makes it probable that the gonococcus is the exciting cause, washing out the vagina with argyrol (20 per cent.), or protargol (10 per cent.), or other weak silver preparation is a reasonable and probably a beneficial thing to do. In a course of expectant treatment there are two things which must be avoided—namely, repeated vaginal examinations and attempts to apply local treatment to the cervical canal and uterine cavity. Both are useless and both are an infringement of the important principle of rest for the inflamed parts. Any handling of the pelvic organs is likely to cause a spread of the infection.

It will be apparent that this hitherto popular policy is simply one of "wait and see." The best that can be said for it is that it gains time and gives nature a chance. The modern abdominal surgeon has good reason to regard nature as a very uncertain lady, and it may be safely affirmed that such a programme will no longer satisfy the requirements of such a progressive art as present-day gynaecology is. An acute salpingo-oöphoritis is very much akin to an acute appendicitis. Just as leakage from a burst vermiform appendix is the chief source of danger to the patient, so also is leakage from an inflamed Fallopian tube the main thing to be feared. An acutely inflamed appendix is now removed as soon as it is recognized or even suspected to exist. Why should not an acutely inflamed tube be treated in the same way? It is true that in tubal cases the inflammation is only part of an extensive affection which involves the uterus as well as the tube; but the tube is the important structure. The patient's life is in danger from it, and not from the inflamed uterus. It is also true that a woman regards her

vermiform appendix as a useless and uninteresting organ which she is quite willing to get rid of when it gives her trouble, while she will part with her Fallopian tube with reluctance, even when it is a source of inconvenience. This is a matter of sentiment. An acutely inflamed tube is likely to be permanently useless, and is as likely to be a lasting source of trouble and risk as an acutely inflamed appendix. There does not seem to be any substantial reason why an inflamed tube should be treated on expectant lines and an inflamed appendix removed as soon as possible.

The expectant treatment of acute tubal inflammation has survived because we are influenced by a habit of thought which has outlived its time. What is good in the appendix case would appear to be equally good in the tubal case. However sound this view may be in theory, it must be admitted that operations on acutely inflamed tubes have in the past not been very successful. Why is this? I think it is simply a question of time. Until recently operations were only performed on those cases which were rapidly going from bad to worse under expectant treatment. They were done too late, when the condition was already hopeless. I remember when operations on cases of acute appendix inflammation were so dangerous as to be questionable. This was simply because they were done too late. A fuller knowledge led to earlier operation, with most gratifying results.

Tubal cases have not been operated on as soon as they were diagnosed. Time has been lost in carrying out expectant treatment, and the case has only been operated on when the prospects of success were doubtful. If the public and the profession recognized the fact that an inflamed tube should be removed at the earliest possible moment, I see no reason to doubt that operations in acute tubal inflammations would be as successful as they are in acute appendix inflammations.

If we admit the advisability of early operation in acute salpingo-oöphoritis, it is necessary to consider the kind of operation best suited to the condition. An incision in the posterior vaginal fornix and the insertion of gauze drains into the pouch of Douglas has been advocated. It is claimed that in cases so treated the tubes never suppurate. No organ is removed. The gauze drains are depended upon to turn the scale in favour of recovery. The adherents of this method admit that it is much more suitable for gonorrhoeal than for septic cases. How are we to say for certain that an acute case is purely gonorrhoeal in origin? We cannot do it. Moreover, the operation does not remove the tube, which is the chief source of present and future danger to the patient. It is simply a kind of extension of the expectant line of treatment.

The more rational plan is to open the abdomen in front, inspect the affected organs, and remove everything that is considered to be a source of danger to life. As a rule, the inflamed tube or tubes will be the only structures needing excision. The ovarian inflammation, being secondary to the tubal condition, will subside, and the ovaries need not be removed, in part or wholly, unless there is good ground for interfering with them. In women under 40 every effort should be made to leave as much ovarian tissue as possible. It will save time if we defer any mention of drainage in these cases until later on.

It may be fairly objected that the woman will be barren after the removal of both her tubes for acute inflammation. What is the alternative? Without early operation she will probably be barren, and will ultimately have to get her tubes removed after years of suffering, and when dense adhesions have formed and made the operation more difficult. When one tube only is so inflamed as to require removal there is good reason to hope that the operation will give the other tube a chance of remaining capable of functioning. The woman will run less risk of being barren after a unilateral operation than she would have run had there been no operation. Upon the whole the weight of the argument would appear to me to be in favour of removal of the inflamed tube at the earliest possible moment.

It must be always borne in mind that delay in a tubal case is as unwise from the operative standpoint as delay in an appendix case. The earlier the operation is done the more likely is it to be successful. I would here like to be allowed to go beyond the limits of the present discussion so far as to say that in appendicectomy in women the incision should always be made in or near the middle line so that inspection of the ovaries and tubes may be possible. The lateral incision does not give proper access to the pelvic organs. Many cases diagnosed as appendical turn out to be tubal or ovarian. Therefore I think the median incision should, in most cases of appendicectomy in women, be chosen in preference to the lateral incision.

II. Chronic Salpingo-oöphoritis.

In the present state of professional practice in acute cases the vast majority of patients drift over into the category of chronic salpingo-oöphoritis and go through a prolonged period of ill health, many in the end being compelled to seek relief from operation. Rest, douching, vaginal tampons of ichthyol or other medicament, treatment at health resorts, and many other devices have been employed to relieve the sufferers. A certain degree of success is attained by such remedial measures. In the majority of chronic cases there can be no objection to a trial of these palliative methods. Each practitioner will uphold the efficacy of his favourite line of treatment and will relate the histories of cases which support his views, but a calm consideration of the situation will show that changes for the better are produced by lapse of time rather than by the efforts of the doctor. While the patient is kept in good heart by harmless medical attention, nature gets a chance of repairing the damage as far as she can.

Chronic salpingo-oöphoritis produces two classes of patient: (1) in one the symptoms of disease become absent or trivial, and the woman seeks advice on account of her barren condition; (2) in the other class the patient suffers from more or less pronounced general ill health, and complains much of pain and discomfort of pelvic origin. Recurrent attacks of acute inflammation are not uncommon.

1. *In the case of women whose main trouble is sterility* expectant treatment finds its chief place. The use of mercury by vaginal inunction or otherwise has been credited with cures. Nowadays the Wassermann reaction will enable us to decide whether antisyphilitic treatment is worth a trial. Dilatation of the cervix and curetting of the uterus is often done, and is occasionally followed by conception. It may be argued that curetting makes the uterus more healthy, and thus gives the tubes a better chance of recovery from the effects of an ascending infection. Is it not more likely that, when conception follows this operation in a case of chronic salpingo-oöphoritis, the success is due to the bursting of a hydrosalpinx, which leaves a patent tube in place of one which has been long sealed up?

Massage of the uterus and tubes has been advocated. This method has never met with much favour among British gynaecologists. We have not sufficiently recognized its merits in properly selected cases of sterility following an attack of salpingo-oöphoritis. It tends to break down adhesions, and it probably sometimes tears away adhesions of the fimbriated end of the tube, thus allowing the fluid of a hydrosalpinx to escape and restoring the function of the tube so that the ovum is enabled to reach the uterus. Notwithstanding its obvious drawbacks and dangers I think pelvic massage should get a fair trial in suitable cases of sterility due to chronic salpingo-oöphoritis. Done by a nurse pelvic massage is not of much value. It is a method of treatment which should receive the attention of lady practitioners of gynaecology. In their hands it would be free from many of the objections which might be raised against it. There is no doubt that in some cases of sterility due to an old salpingo-oöphoritis pregnancy has followed a carefully carried out course of pelvic massage.

In spite of the use of expectant measures, including curetting and pelvic massage, a large proportion of these cases remain barren, and we have to resort to abdominal operation. Excision of more or less of the ampullary portion of the tube will be required, and a new mouth must be made for the tube by stitching the cut edges with fine catgut. Tweedy's method of pushing fine stiff catgut along the tube into the uterus and leaving it to act as a sort of temporary bougie or drain is possibly of some advantage. The question as to whether the ovary should be left entire or whether a portion of it should be excised must be left to the judgement of the surgeon. As the operation is being done on account of sterility, needless to say, the ovaries should be damaged as little as possible. It is essential that the ovary should, if necessary, be fixed near the new mouth made for the tube.

2. We come now to the consideration of those *chronic cases which lead lives of pelvic pain and misery*, with or without recurrent acute inflammatory attacks. For them palliative or expectant methods are comparatively useless. Operation is the one thing needful, provided that there is no evidence of syphilitic infection, or, if there is such evidence, that

antisyphilitic treatment has failed. The operation should always be abdominal. In saying this I do not exclude the palliative value of opening an acute abscess which is pointing in the vagina or elsewhere. This is merely a temporary expedient. The extent of the abdominal operation must be determined by two circumstances—the age of the patient and the gravity of the condition.

In regard to the consideration of age it is better, in a woman over 40, completely to remove both the tube and ovary and take no chances of her having pain or discomfort from an ovary or a portion of an ovary left behind. In younger women the most conservative operation possible should be performed, and the patient left with some hope of pregnancy however remote. This means the leaving of as much of the uterine end of the tube as possible, the formation of a new mouth for the tube when practicable, and doing the least possible damage to the ovary. In the younger women it is better to risk the future occurrence of some ovarian pain than to render the patient hopelessly barren. In a few bad chronic cases the diseased condition may be so extensive as to make removal of the uterus, as well as of the tubes and ovaries, necessary, irrespective of the age of the patient.

Drainage.—To drain or not to drain after pelvic operations for salpingo-oöphoritis is still the question. Many of us feel safer in all acute and many chronic cases when we have packed the pelvis with gauze partly ensheathed in thin rubber. We may perhaps be regarded as the die-hards of the old gang, but many of the younger American surgeons still use gauze drainage. There is much to be said for the method, so strongly supported by Ranken Lyle, of filling the abdomen with saline solution and completely closing the parietal wound. I confess that I am trying hard to persuade myself to discard drainage. There are certain conditions in which I still think drainage is absolutely necessary. When an abscess has been discharging into the bladder or into the rectum, or when the rectum has been torn in the course of a struggle with adhesions, the gauze drain finds a legitimate place.

I shall conclude with the remark that a preliminary colostomy should be done about a fortnight before the pelvic operation is undertaken in all cases in which an abscess is known to have been discharging into the rectum. The colostomy opening should not be closed until three months have elapsed.

Vaccines.—The use of vaccines is of secondary importance. It is an ancillary measure which has its proper place as part of the post-operative treatment.

DISCUSSION.

The President thanked Dr. Campbell for his valuable paper. He noticed that Dr. Campbell had deliberately stated his case in a provocative manner. He himself could not regard the acutely inflamed tube in quite the same light as the acutely inflamed appendix. The chances of efficient recovery in the tube were better. In regard to tuberculous salpingitis, most of them up to the time of operation were unsuspected. It had been found that nearly 10 per cent. of removed tubes turned out on careful examination to be tuberculous. On the question of drainage his own feeling was that drainage should be reduced to an absolute minimum.

Dr. Nigel Stark (Glasgow) did not think that any analogy could be drawn between the appendix and the Fallopian tube; the conditions were quite different. An acute tube did not become gangrenous and cause such sudden serious danger as might occur at any moment in an acutely inflamed appendix. Again, a distinction must be drawn between salpingitis and pyosalpinx. Even an acute pyosalpinx might die down and leave healthy tubes, and at any rate he did not think that acute pyosalpinx was very common nowadays. An important point to be considered was that of prophylaxis. Gonorrhoea ought to become less common by better education of the public and by venereal clinics. Tuberculous salpingitis was excessively common in Glasgow; nearly every woman seemed to show some evidence of abdominal tubercle. The condition was caused by the ingestion of tuberculous milk in early life, and it was exceedingly damaging to the female generative organs. Sterility was in a great many cases due to chronic tuberculous infection of the tubes and ovaries, and education of the public in regard to this danger was urgently called for.

Dr. Farquhar Murray (Newcastle), referring to the use of saline in cases of pelvic inflammation, quoted the excellent results obtained after closure of the abdomen without drainage. In his opinion saline had an important influence in cases of oozing after pelvic operations, the mechanical pressure of the saline serving to check the oozing.

Dr. S. J. Cameron (Glasgow) thought that Dr. Campbell had made his analogy between the appendix and the tube in order to provoke discussion. His own view was that if one were sure that he had a pyosalpinx to deal with it was best to leave it alone unless general peritonitis threatened. Dr. Cameron said he made it a rule to drain the abdominal cavity in all cases where the peritoneum had been soiled by pus during the removal of acutely inflamed tubes. He had never regretted the introduction of a gauze drain. Despite the recommendation of some American gynaecologists that the ovaries should always be removed in cases of chronic salpingo-oöphoritis, he believed that an endeavour should be made to preserve healthy ovarian tissue. In chronic cases the uterus as well as the tubes should be excised. Panhysterectomy should be employed, as otherwise a persistent discharge would issue from the diseased cervix.

Professor Louise McIlroy (London) strongly objected to the statement that the loss of a tube was purely a matter of sentiment. It was a mutilating operation, and mutilating operations were to be avoided whenever possible. The importance of the internal secretion of the ovary and its influence on metabolism must always be borne in mind when the question of complete removal of both ovaries was considered. She thought that it was very difficult to diagnose gonococcal salpingitis with certainty; a bilateral infection was generally gonococcal. A unilateral infection was easy to deal with. She strongly agreed that the median incision in women was the ideal one when dealing with all conditions in the lower abdomen. She was in favour of drainage by the vagina, even in appendix cases; she had completely given up abdominal drainage, and was sure that she had saved many lives by vaginal drainage. In regard to sterility she urged that the husband should always be examined to determine whether or not he was responsible for the sterility. She thought that in the chronic inflammatory conditions radiant heat was much better than douching. Pelvic massage was very useful but difficult to apply without an experienced operator. She asked whether Dr. Campbell had had any experience of inflating the tube with air to break down adhesions.

Professor Munro Kerr (Glasgow) expressed the view that salpingitis should be divided into: (1) acute primary salpingitis; (2) chronic salpingitis, with (*a*) an acute phase and (*b*) a quiescent phase. Acute primary salpingitis, he thought, comparatively rarely called for immediate operation, but, when it was necessary, simple removal of the tube or tubes would not be sufficient unless the uterus was also removed, as it also was infected. He preferred to pack off the pelvis with gauze and drain through the vagina. In regard to the treatment of the acute phase of a chronic salpingitis, he thought it certainly was a debatable point as to the best time to operate. He personally thought it was better to wait until the acute phase had passed; if necessary, simply draining by the vagina. Later on in the quiescent phase, if both tubes were in a hopeless condition, then he considered that they should be removed, together with the uterus and cervix. Free drainage was thus secured. Nothing was to be gained by leaving behind a diseased uterus,

Professor R. J. Johnstone (Belfast) said that he knew Dr. Campbell, and he did not think that he should be taken too seriously. He was somewhat surprised himself at the comparison being made between the appendix and tube. In regard to the removal of pus tubes, he thought there was a form of tube where it was advisable to leave the uterus behind; he referred to those cases where the uterine stump was healthy. On the subject of the vexed question of drainage, his experience had been varied. He had started originally as an advocate of no drainage. This succeeded for a time, and then he had a disaster; after that he practised vaginal drainage for a time, until another disaster caused him to adopt drainage by both abdomen and vagina. He had since given up vaginal drainage entirely. His practice was always to drain by the abdomen all cases where there was

much oozing. Blood clot could so readily become infected. He preferred drainage by tube to gauze; the latter was so painful when removed.

Dr. Campbell, in reply, maintained that, from the surgeon's point of view, a pelvic inflammation was the same whatever its source might be. He always left behind as much ovarian tissue as was possible. He had not tried inflating the tubes with air. He was not at all convinced that his analogy between the tube and the appendix was wrong; both might burst and leak, thus endangering the patient's life. The treatment of the acute chronic case differed from that of the primary acute case, as the adhesions one knew must be present in the chronic case encouraged one to wait.

VAGINAL INVOLVEMENT IN CANCER OF THE CERVIX.

[*Abstract.*]

Dr. Archibald Leitch (London) called attention to the liability of cancer of the cervix uteri to extend down the vaginal wall. *Post-mortem* examination of several hundreds of cases showed that in 97.5 per cent. the vagina was more or less extensively involved; in fact it was the commonest of all the findings at autopsy. Involvement of the parametrium, of the interiliac lymph glands, and the occurrence of hydronephrosis were indeed less common. His argument was that these naked-eye appearances found *post mortem* were an indication of the microscopic spread that would be taking place during life. But in addition to such evidence, he had frequently found lymphatic involvement in operation specimens where a vaginal cuff had been removed, and he held that Wertheim, in advocating the removal of a portion of the vagina in order to enclose the septic cervix, had thus unconsciously done a greater service to radical treatment. Such vaginal removal, however, was not sufficiently thorough. Dr. Leitch in pursuing these investigations had on some occasions encountered irregular proliferations of the vaginal mucosa penetrating the underlying tissues, early epitheliomata in fact, which were quite distinct from lymphatic spread, and he suggested that these were due to the same cause, possibly an endogenous irritant, which had produced the original malignant tumour of the cervix. They were later in manifesting themselves, probably because the vaginal epithelium was more resistant to the causal agent.

THE ETIOLOGY AND TREATMENT OF NON-PYOGENIC NEPHRITIS (BRIGHT'S DISEASE).

BY

W. M. CROFTON, M.D.,

LECTURER IN SPECIAL PATHOLOGY, UNIVERSITY COLLEGE, DUBLIN, AND PATHOLOGIST TO DR. STEEVENS'S HOSPITAL.

There is, with the possible exceptions of the cancer problem and the cause of certain acute infections such as measles, no more obscure region of pathology than that of non-pyogenic nephritis, or Bright's disease. It is with the hope of stimulating further observations, more extensive and more completely controlled, that I describe the following small series of cases.

The first cases that came my way to observe and treat were just before the war and during my war service in Malta (cases already referred to elsewhere), but from the war cases one could not draw very definite conclusions, since when convalescent these patients were shifted home and lost sight of; all of them improved very considerably under therapeutic immunization.

Before describing cases it may be well to consider briefly the present state of opinion on the subject of nephritis. It is recognized, of course, that acute nephritis is associated with acute infections undoubtedly caused by microbes, and it seems to be accepted that the cause of the nephritis is the same as that of the original lesions—for example, tonsillitis. It is recognized, too, that the chronic disease may follow the acute, and one presumes that it is recognized that the same microbial cause may persist, and that in this class of case the chronic nephritis is due to microbes. In the largest class of cases, however, no microbial cause appears to be recognized, and treatment is purely dietetic and directed to the treatment of symptoms.

H. Maclean in his recent excellent monograph on the diagnosis and treatment of renal disease assumes the position, if I do not misinterpret him, that protein and casts may be present in the urine but renal disease is not present so long as (*a*) there is no retention of urea, uric acid, creatinin, and the purin bases, (*b*) there is no retention of chlorides with consequent oedema, or (*c*) both. This doctrine appears to me very dangerous from every point of view, for if we adopt it it will tend to prevent our using specific methods of diagnosis and treatment in a large group of cases until the disease is advanced. He himself quotes the fact that experimentally three-quarters of the total kidney tissue may be removed before any accumulation of urea occurs in the blood. Surely this must hold good for destruction brought about by disease, and it is not until approximately a similar amount of essential kidney tissue is interfered with that symptoms of non-protein nitrogen retention (azotaemic type) or of dropsy (hydraemic type) occur.

It appears to be logical, then, to take up the attitude that no kidney can be considered undamaged which is letting through blood proteins, especially if casts are present as well, for such kidneys, if the lesion does not progress, may remain physiologically functional during a normal lifetime. Of course, the original lesion may retrogress owing to the removal of the cause and the recovery of the damaged tubules, the destruction of the cause preventing the damage of further tubules, so that sufficient functional tissue is left to prevent the appearance of symptoms. On the other hand, the primary illness with acute symptoms may entirely clear up and if the cause is only partly overcome and persists in a less virulent form a slow sclerosis may develop gradually, cutting off the blood supply of the tubules and lead to the strangulation of the whole tubular system.

This sclerosis, as is generally recognized, may follow on an acute attack or begin in an insidious manner and slowly progress. What, then, is the cause of albuminuria without symptoms and albuminuria with symptoms? One may rule out such minor causes as acute or chronic poisoning by inorganic or organic poisons such as lead or turpentine, and one must admit in the trench nephritis occurring in France the urine on culture was constantly sterile, but in the cases coming from Gallipoli that I saw, acute or subacute, and in the ordinary cases in civil practice there is no difficulty in isolating micro-organisms from the urine and identifying them, for reasons to be stated below, as the cause of the disease.

The functions of the kidneys are usually stated to be:

1. Excretion of water.
2. Removal from the body of certain waste products of nitrogenous metabolism.
3. Removal of acid products from the body.
4. Maintenance of the optimum concentration of salts in the fluids and tissues.
5. Excretion of toxic materials artificially introduced.

This list leaves out one of the most important functions of the kidney—namely, the excretion of micro-organisms, or, in strictly localized infections, such as diphtheria, the excretion of their toxins.

The resistance of the kidney to virulent micro-organisms is very remarkable; in only a minority of cases of acute septicaemias from whose blood the kidneys abstract and excrete the causative organism do the kidneys become acutely inflamed and damaged. It is not yet generally recognized that many infections thought to be strictly localized are in reality focal manifestations of a subacute or chronic septicaemia. In my experience in cases of boils, carbuncles, and such-like infections the staphylococci can always be recovered from the urine. So, too, in the few cases of scarlet fever I have had to treat streptococci were recovered from it. In a proportion of cases of "rheumatic conditions" staphylococci or streptococci, or both, or *B. coli*, are found in the urine; sometimes other microbes, such as diphtheroids—in all these without, as a rule, any signs or symptoms of nephritis. It is not surprising, then, that in some patients whose kidneys are excreting microbes the kidneys should fall a victim to the microbe and become diseased. The lowering of the resistance of the kidney cells may be brought about by any of the general causes of lowering of general or focal resistance—grief, chilling of the surface, alcohol, or the excretion of abnormal waste products from a distant focus of microbial action—for example, of the intestinal tract, of the bones, and so on.

In all the cases treated by me I have isolated a microbe from the urine; in the majority of cases staphylococci, in a few streptococci as well. I shall be asked at once how I know

these microbes are the cause of the disease. Do they fulfil Koch's postulates? Did they produce the disease in animals? Were they isolated from the animals? Of course not. In how many cases of human disease certainly associated with a given cause can Koch's postulates be fulfilled? In 10 per cent.? If this is so it must be the extreme limit.

If Koch's postulates are not fulfilled what criteria of infectivity are we to accept? The finding of specific antibodies—adapters (a generic name for amboceptor, immune body, substance sensibilisatrice, coferment), agglutinins, and so forth? Perhaps so, but always in the animal body will these antibodies be found for such common microbes as staphylococci, streptococci, diphtheroids, and the tubercle bacillus. Fluctuations of the opsonic index may help, but in my experience the following criteria are by far the most reliable—namely, the production of (1) focal reactions, (2) general reactions, (3) cure or improvement, with an antigen made from a microbe or microbes isolated from the patient himself, or alternatively the production of local, general, and focal reactions with an antigen used for diagnostic purposes, such as tuberculin.

Let me take this case first as it is most familiar to most people. It may be said that the tubercle bacillus fulfils Koch's postulates, but it is at least arguable whether the human lung disease is reproducible in animals, for lung tuberculosis is practically never an unmixed infection, while animal tuberculosis nearly always is. Local reactions are of little or no use either for the diagnosis of tuberculosis or any other disease, since the presence of antibodies in the circulation enables an intradermal reaction to occur. Any antigen given under the skin may produce a redness or swelling.

General reactions are more important. My experience is that in the case of tuberculosis, if the tuberculin is given in the prescribed doses, a general reaction is at least 90 per cent. diagnostic, for when a lesion is present it is accompanied by a focal reaction. Indeed the site of the lesion may be made manifest by this focal reaction such as the occurrence of crepitations in an area of a lung where they were previously absent, the increase or decrease of the physical signs or symptoms in a kidney or joint or bone, the increase of discharge from a mucous membrane or sinus, the decrease or increase of albumin in the urine. The late Professor White in a case of discharging wounds or sinuses used to work out the curves of focal reaction by periodical counting of the microbes in the discharge. In nephritis, as I shall show below, the curves of reaction can be precisely worked out by the daily estimation of the protein in the urine. When the lesion is closed to the surface the reaction is very definitely shown by a sudden increase or decrease of symptoms and physical signs—in a knee-joint, for instance, or in the central nervous system in epidemic meningitis or encephalitis. The sensitiveness to small doses of the infecting antigen is very remarkable. For instance, in tuberculosis I have quite often produced a slight but definite general reaction after a dose of 0.00000001 mg. H.T.S., while in a patient without active lesion 0.1 mg. has no effect. In mucous colitis focal reactions after 1 million (about 0.0003 mg.) *B. coli* antigen are quite common. One might multiply instances indefinitely; on the other hand one could give one hundred times the dose of a non-specific microbial antigen subcutaneously without reaction. Finally, if having given a course of microbial antigen to a patient the lesion retrogresses or completely heals up, it is in my experience 99 per cent. at least probable that the antigen or antigens used are specific.

I have argued many times before the question of the use of non-specific antigens. I shall only ask again, If they are so successful as some would have us believe, why were they such a tragic failure in wound infections in the late war?

Now, if the criteria I have laid down are correct, the identity of the infecting micro-organisms is completely proved, for in the majority of cases to be described there were general and focal reactions and marked retrogression or cure in almost every case. I have only lost one patient so far, and he was so far advanced that no hope of recovery could be entertained; I have not therefore described his case.

Albuminuria without Obvious Oedema.

CASE I.

A patient of Dr. Cooke, a man aged 28, seen first in 1914. Had been rejected three times for life insurance on account of albuminuria. The amount was 1 gram per litre. Staphylococcus isolated. The doses given were 10, 25, 50, 75, 100, 150, 200 million. The albumin disappeared after the 100 million dose. The patient then disappeared for three months, but was still free from albumin when he turned up again, and has remained free since.

CASE II.

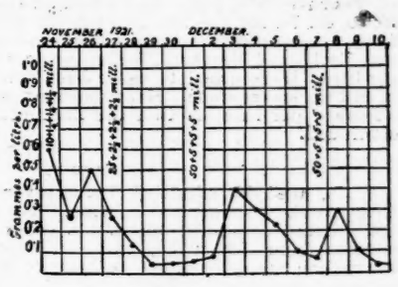
D. B., aged 17. Seen in 1919. Laboratory assistant. Had been cured of tuberculous glands in neck with tuberculin (H.T.S.). Was pale and easily tired. He found distinct cloud of albumin in his urine on several occasions. Cultures of special specimen gave culture of *Staphylococcus albus*. He was given doses of 10, 25, 50, 75, 100, 150, 200, 300, 400 million. The albumin rapidly disappeared, and has remained absent since (September, 1922).

CASE III.

Medical student, aged 26. Seen first February 25th, 1920. For three years or more noticed frequency of micturition during the day, especially during cold weather. Examination of mixed twenty-four hours' collection gave 0.75 gram per 1,000 albumin. *S. albus* isolated. Doses 10, 25, 50, 75, 100, 150, 200, 400, 600, 800, 1,000, 1,500, 2,000, 3,000, 4,000 million given at suitable intervals according to reactions. After the 200 million dose the albumin which had reduced to a trace increased to 0.5 gram per litre and then gradually disappeared, three weeks' interval being left. He remains now (1922) completely free from albumin.

CASE IV.

Boy, aged 6. Seen first on November 10th, 1921. Sent to me by Dr. Strangman for chronic bronchitis, asthma, and constipation. The boy looked pasty, and on examination of a sample of a twenty-four hours' collection it was found to contain about 0.6 gram per litre of albumin. From his sputum were isolated *S. albus*, *M. catarrhalis*, and streptococci. *S. albus* was isolated from his urine and *B. coli* from his faeces. A mixed antigen was made. I omitted the *S. albus* from his urine as I was anxious to see whether the *S. albus* from his sputum would produce focal reactions in his kidneys and thus confirm my opinion as to its probable mode of entrance into his circulation. These focal reactions occurred early in his treatment, and very prettily demonstrated the occurrence of focal reactions in the kidneys.



Case IV. Focal reactions.

The series of doses was—

S. albus.		M. catarrhalis.		Streptococci.		B. coli.
10	+	1½	+	1½	+	1½
25	+	2½	+	2½	+	2½
50	+	5	+	5	+	5
50	+	5	+	5	+	5
75	+	7½	+	7½	+	7½
100	+	10	+	10	+	10
and so on to						
2,000	+	200	+	200	+	200

Some of the doses had to be repeated owing to focal reactions in his lungs. After the second dose of 175 + 17½ + 17½ + 17½ albumin completely disappeared. His treatment was concluded on February 2nd, 1922, and he has remained well since.

These cases will suffice to illustrate the functional albuminuria type of case. I have not so far met a case in which I did not isolate a microbe from the urine and cure it by immunization. But my experience is still small.

Cases with Obvious Oedema.

CASE I.

Constable X, aged 30. Admitted to Dr. Steevens's Hospital under Dr. Kirkpatrick, October, 1916, with general oedema and a heavy cloud of albumin. When I saw him he had lost the oedema under ordinary treatment, but still had 1 to 2 grams per litre of albumin. I isolated *S. albus* from his urine. Doses of 10, 25, 50, 75, 100, and 200 million were given at suitable intervals. At the end of three weeks albumin had completely disappeared from his urine, and he was sent home apparently cured at the end of four weeks.

CASE II.

J. B., aged 14. Came under my care in February, 1918, with generalized oedema, severe headache, and amblyopia. She was passing 50 oz. of urine containing 1 gram per litre of albumin, and giving a profuse growth of *S. albus*. Temperature normal. After the first dose, 25 million of antigen, there was a general and focal reaction, her temperature going to 99.4° for two nights, her oedema and headache increasing and her urine to 3½ pints, containing still 1 gram per litre. The doses were increased at suitable intervals to 4,000 million, when the urine contained a bare trace of albumin and the patient had no symptoms. On re-examination five months after a catheter specimen still contained a trace of albumin and staphylococci were again isolated, so she was given a second course of antigen beginning with a dose of 100 million and increased to 20,000 million. Her urine had then been free of albumin and microbes for some time, and remains so still (September, 1922).

CASE III.

J. C., aged 18, admitted to Dr. Steevens's Hospital in an unconscious state, under Dr. Kirkpatrick, November 29th, 1919, having had a fit on a railway station platform on his way home.

He gave a history of three weeks' illness. He had general oedema, evening temperature 101° F., pulse 124. He was bled, given an enema and hot pack, with only water to drink. He recovered consciousness under this treatment. I saw him a fortnight after. He was then generally oedematous, passing 20 oz. of urine, which contained a large quantity of albumin and a few pus cells. *S. albus* and streptococci were isolated. He was given 25 million staphylococcus antigen + 2½ streptococcus antigen on December 18th, 1919, and the doses were increased to 1,000 + 100. The series was 25 + 2½, 50 + 5, 75 + 7½, 100 + 10, 150 + 15, 200 + 20, 300 + 30, 400 + 40, 800 + 75, 1,000 + 100. He had distinct focal and general reactions after the first few doses. After the first his temperature went to 101.8° F., and his urine increased from 20 to 40 oz. in twenty-four hours. He was discharged apparently cured on February 11th, 1920.

CASE IV.

J. K., aged 39, labourer, was admitted into Dr. Steevens's Hospital on December 23rd, 1919, with severe headache and general oedema. He was passing 15 oz. of urine loaded with albumin. He gave a history of several similar attacks. When I saw him at the end of January, 1920, he was still oedematous and had severe headaches. His urine contained 4 grams per litre of albumin, and he was passing about 70 oz. in the twenty-four hours. *S. albus* was isolated from his urine and 5 million antigen was given on February 2nd, 1920. The series of doses was 5, 10, 15, 20, 30, 40, 50, 60, 75, 100, 150, 200, 300, 400, 600, 800, 1,000, 1,250, 1,500, 1,750, 2,000. He steadily improved, losing his headache and oedema, and was discharged May 9th, 1920, his urine containing 0.75 to 1 gram per litre. He returned to work June 20th, 1920, and has remained in full work ever since. His urine now (September, 1922) contains 0.5 gram per litre, so that the improvement in his kindeys has continued.

CASE V.

P. C., aged 14, admitted Dr. Steevens's Hospital under Dr. Kirkpatrick with general oedema. Temperature 101° F., pulse 104. Urine contained blood. *S. albus* and streptococci were isolated from his urine, and on March 2nd he was given 10 million staphylococcus antigen + 1½ million streptococcus antigen; the series of doses was: 10 + 1½, 25 + 2½, 50 + 5, 75 + 7½, 100 + 10, 150 + 15, 200 + 20, 400 + 40, 600 + 50, 800 + 75, 1,000 + 100, 1,500 + 150, 2,000 + 200. The focal reactions in this case were very pronounced after the third dose; for instance, the albumin, which was 1.5 grams before the dose, increased to 4 grams on the next day, and then fell to 1 gram on the fifth day after. The boy left hospital on June 7th, 1920, with a bare trace of albumin. He has remained well since and is now (September, 1922) quite free from albumin.

CASE VI.

Girl aged 17, under the care of Dr. Pepper, gave a history of chronic nephritis with acute exacerbations for many years. When she came under treatment she was suffering from violent headache, general oedema, and her urine contained 2 grams per litre albumin. Staphylococci and streptococci were isolated from her urine. She was given 5 million staphylococcus + 1 million streptococcus antigen, which was steadily increased until a dose of 4,000 + 500 million was attained. The patient had then greatly improved. Her headaches had greatly diminished and her oedema had disappeared. The albumin had reduced to 0.75 gram per litre. She is now (September, 1922) in good health; no oedema of her legs, her only symptoms being occasional slight headaches. Her urine still contains 0.7 gram per litre albumin.

CASE VII.

V. F., a boy aged 5, admitted to Dr. Steevens's Hospital under Dr. Winter, October 19th, 1921, with general oedema and headache, passing 10 oz. urine containing over 12 grams per litre of albumin. The albumin fluctuated in an extraordinary way, being sometimes as low as 0.5 gram and as high as the U mark on the Esbach tube. When I saw him in December, 1921, his oedema and general condition had greatly improved, but he had still an enormous quantity of albumin. Staphylococci and streptococci were isolated. He was given 5 + 1, and had a very distinct increase of oedema after this and several other doses. As the albumin did not show any improvement after the 50 + 10 dose I reinvestigated the bacteriology of his urine, and found as well as the other microbes a coliform bacillus. The addition of an antigen of this did not, however, make any difference, and he left hospital May 31st, 1922, in very good general condition, but still passing as much albumin as ever. Evidently his kidneys were irretrievably damaged. The initial dose was 5 million staphylococcus + 1 million streptococcus antigen, and the series was: 5 + 1, 7½ + 1½, 10 + 2, 15 + 3, 20 + 4, 30 + 6, 40 + 8, 50 + 10, 60 + 10 + 2½ (coliform antigen), 75 + 15 + 5, 100 + 12½ + 7½, 150 + 20 + 10, 200 + 25 + 12½, 300 + 30 + 15, 400 + 40 + 20, 500 + 50 + 30. This boy now (September, 1922) is playing about like a normal child with no sign of illness, but has still 3 grams per litre of albumin. His after-history will be interesting.

I could add other cases, but I hope these will sufficiently illustrate the possibilities of the treatment. Even if complete cure is not possible one can often, as in Cases IV and VI, restore them to good health and full working capacity. If the cases are taken in time, complete cure ought to be possible in the large majority of them. I am as ever deeply indebted to my colleagues at Dr. Steevens's Hospital for placing their cases at my disposal.

RESTORATION OF THE SUNKEN NOSE.

BY

HAROLD BURROWS, C.B.E., F.R.C.S.,

ASSISTANT SURGEON, ROYAL PORTSMOUTH HOSPITAL.

THE practice of making good a defect of the contour of the nose by inserting a graft of cartilage beneath the skin is one the soundness of which is sufficiently well established. Nevertheless, I suppose that most surgeons have sometimes had cause to lament that the practical result has fallen short of the ideal. This being so, any little idea that may help toward the achievement of better results will be acceptable. I would like, therefore, to describe the operation which I have employed, in order to introduce a mechanical detail which has been of considerable assistance.

FIG. 1.—Cast of nose before operation. (In addition to the sunken bridge there is considerable deformity of the anterior nares, from old ulceration.)

FIG. 2.—Cast of same nose after operation.

Preliminary Measures.—The first step is to obtain a plaster cast of the patient's nose and neighbouring features. Having acquired this, the nasal defect which is shown in the cast is filled with plasticine, which is moulded with care so as to produce on the plaster model the shape of nose which it is hoped to reproduce on the patient. This plasticine model of the nasal defect is then removed from the plaster cast and well powdered with boric acid. This dries the plasticine, which, when dry, is less likely to become altered in shape under subsequent handling. With a small metal calliper the length of the plasticine model is measured.

FIG. 3.—Plasticine models. The two small pieces represent grafts used to stiffen the alae nasi, which were sunk and lacking in cartilaginous support.

Operation.—With the patient under general anaesthesia the right fourth rib cartilage is removed. The separated fragment is replaced in its bed and the skin wound temporarily closed with towel clips. This having been done, a transverse incision is made across the nose at the level where the bridge of a pair of spectacles would naturally rest. Through this incision the skin of the nose is separated from the underlying structures over the whole area of the nasal defect. The towel clips are now taken from the chest wound and the cartilage is removed for modelling. First of all it is cut to the correct length as shown exactly by the calliper. Then, with the plasticine model held in front of him by a nurse who can manipulate it as required, the surgeon carves the piece of cartilage in the likeness of the clay model, and having completed this fashioning the graft is slipped into its bed in the nose, the skin incision being closed by two or three horsehair sutures. The chest wound is then sewn up and a dressing applied. But no dressing other than a dusting with boric powder is used for the nose.

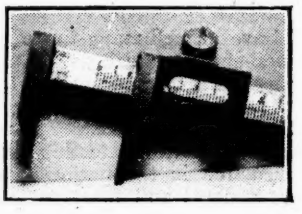


FIG. 4.—Metal calliper for measuring the grafts.

After-Course.—The horsehair stitches are removed on the fifth day. The cartilage graft having been properly modelled lies comfortably in its bed without any tendency to slip out of place.

Comments on the Operation.

1. By raising the bridge of the nose an epicanthus can be eliminated.

2. Scarring of the skin of the nose from previous trauma or disease interferes considerably with the cosmetic result of the operation just described.

3. In many cases the defect is too deep to be filled by a single cartilage graft—as, for example, in those instances in which a patient can see one eyeball with the other eye. Here the operation is duplicated. The right fourth cartilage is used for the first operation, and at the second operation, which is done only after an interval of one year or longer, the left fourth rib cartilage is used to complete the filling of the defect.

4. Cartilage, especially when wet with normal saline, is a slippery substance to hold, and unless he is well on guard against such an accident the surgeon may find the graft slip out of his fingers and come to rest upon some unintended and infected landing place.

5. In one instance the cartilage graft shifted after the operation had been completed.

This was in a case of a very large defect, and during the first operation it occurred to me that I might be able to remedy to some extent the forward prospect of the nostrils by making the cartilage graft somewhat longer than the plasticine model, so that when inserted it would thrust downward the lower end of the nose. There was such a deep ledge for the graft to rest against at the upper end of the defect that I thought dislocation was impossible. However, the graft did gradually become displaced, the upper end slipping forward and upward.

Had this displacement taken place laterally, or had the case been one where a single graft only was needed, the accident would have been most unfortunate. As it is, however, probably no irregularity will be noticeable when the second stage has been completed. In any case, I do not now think it was sound practice to attempt an elongation of the nose by inserting a graft large enough to cause considerable pressure and counter-pressure.

INJURY TO THE BOWEL WITH RECURRENT HAEMORRHAGE.

BY

MAURICE HORAN, F.R.C.S.EDIN.,

SURGICAL SPECIALIST, WAR PENSIONS HOSPITAL, SUNDERLAND.

THE following case is recorded as one of interest on account of the long history and intermittent character of the symptoms, of which haemorrhage was a prominent feature. It has been suggested that the recurrent haemorrhage was due to the formation of an aneurysm in a vessel at the site of injury in the bowel, which appears to be the most probable explanation of the case.

Pensioner J. B., aged 33, was admitted to hospital on January 13th, 1922. In 1917, while serving in the trenches during shelling, he was struck in the abdomen by a sandbag blown in from the parapet. He was seized with abdominal pain, shortly followed by the passage of dark-coloured blood from the rectum in considerable quantity. He was admitted to hospital, and after a couple of weeks, the pains having subsided and no further haemorrhage occurring, was transferred to England. While in hospital there he had two more severe haemorrhages from the bowel accompanied with pain, and the question of operation was considered. This was eventually negatived, and he was discharged some time later. Since then haemorrhage, similar in character but slight in amount, generally followed the taking of solid or more particularly of indigestible food. The haemorrhage was always accompanied with pain. He voluntarily restricted himself to a diet mainly of slops, and from being a professional footballer had refrained from exercise.

On examination tenderness was present in the left side of the abdomen, to which area the pain was referred. Nothing else was detected. Rectal examination was negative. In the course of preparation for a laparotomy which was decided on the administration of an enema was followed by a good deal of pain and the passage of a quantity of dark-coloured blood.

The abdomen was opened to the left of the middle line and the gut was systematically examined. Two small areas of scarring, without deformity, were present in the lower part of the ileum. In the lower part of the jejunum a circular area of bluish discoloration of the size of a farthing and resembling a haematoma was present on the antimesenteric surface of the gut; extending from this, to the root of the mesentery, was a cord-like deposit of lymph. On palpating the gut a definite area of thickening corresponding to the discoloration was felt. The remainder of the bowel appeared normal, as did the other viscera. The portion of gut containing the lesion was resected and the continuity of the bowel restored by anastomosis. He made an uneventful recovery and was discharged from hospital on February 23rd, 1922. He has since returned to ordinary diet, and there has been no recurrence of the pain or haemorrhage; he expresses himself as being quite well.

The specimen removed, on section, presented the appearance of a haematoma, dark clotted blood occupying the space between the mucous membrane and outer wall of the bowel. The muscular coats were torn, blood being extravasated throughout, and in direct contact with the mucous membrane, which appeared intact.

My thanks are due to Surgeon Captain Bishop, R.N., C.M.G., administrator of this hospital, for permission to record the case.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

A CROSS-WIRE AXIS FINDER IN ASTIGMATISM.

THE following description of a very simple piece of apparatus may be of interest to those who are engaged in refraction work, for it saves a great deal of time, tends to efficiency, and is so small that it can be carried in the ophthalmoscope case. It consists of a ring, the exact size of the trial lens mount, across the middle of which stretch two fine wires at right angles to one another.

In retinoscopy, if a band of light is seen, or if one appears in the course of correction, this cross is placed in the front cell of the trial frame in such a position that one of the wires is exactly parallel to the edge of the band. This wire is in the axis of astigmatism, and where its extremity appears to meet the scale will give the reading required. The wire is very easily seen as a fine black line against the illumination of the fundus.

There are now four ways of checking the finding:

1. Move your own head slightly sideways, so that the wire is up and down the middle of the band. If now the black line appears parallel to the edges, and does not approach them at an angle either at the top or at the bottom, the axis is indicated correctly.

2. Move your light along the second wire, and if the band keeps at right angles to this and follows the same direction, not sneaking off above or below, the axis is correct.

3. Overcorrect considerably, and the band will appear turned into the other meridian, and should then have the second wire exactly up and down its length.

4. Put a cylinder into the frame, with its axis over the meridian of the wire. If the wire is right there will not appear to be any rotation of the band now; if the wire is wrong the band will appear to be rotated through quite a perceptible amount, this rotation depending partly on the amount of error and partly on the strength of the cylinder used. This is a delicate check, as the error is magnified, so that, say, five degrees of error will send the band round through ten or fifteen.

My instrument was made by removing the brass rim from a trial-box lens and forming the cross of the fine wire used by florists, but it is difficult to get the wires exactly at right angles and to have the crossing point exactly in the centre. I have used it for the last twelve months, doing difficult refractions at an average rate of sixty a week, and find that in nine cases out of ten it gives the cycloplegic correction straight away. The failure in the tenth case is due to fatigue in the observer and is not instrumental in origin. Messrs. Dixey, 3, New Bond Street, will make the apparatus for anyone who requires it.

Southampton. JOSHUA KEYMS, M.D.

THE THIRD STAGE OF LABOUR.

Is anyone prepared to give an authoritative statement why in some cases pressure on the fundus uteri readily delivers the detached placenta and in other cases pressure sufficient to hurt the patient has no effect? The other day I attended a multipara and the second stage made me think I would have an easy time with the after-birth. In twenty minutes, with the easy confidence engendered by the second stage, I pressed on the fundus and there was no satisfactory opening of the vulva that indicates a speedy end. Having ample time I decided to be patient, but after several unsuccessful attempts, including traction on the cord (*Clinical Obstetrics*, Jardine), I found ninety minutes had passed since the child was born, so I proceeded to remove the placenta manually. As I expected, I found it lying in the upper strait of the vagina. It seemed to me that synchronously with my hooking

my finger round the edge of the placenta gentle pressure on the fundus delivered placenta and membranes. There was no tacking back of the latter.

Meditating on this case—and I know my experience is not unique—I thought that the easy cases might be those in which the after-birth comes through the os sideways, and the difficult cases those in which the after-birth comes through the cervix in such a fashion that it lies covering the fornices and the os. The placenta and cord bear the relation, in these circumstances, to the soft parts that the leather sucker of the little boy bears to the stone on which he has tramped it. Atmospheric pressure is in force. In the above case I did not pull on the placenta, I simply hooked my finger round the edge.

To have to introduce one's hand into the vagina for the placenta is distressing, but this distress would be mitigated if those in authority had stated that such procedure was justifiable because necessary and unavoidable.

Kilnhurst. CHARLES J. HILL AITKEN, M.D.

VENESECTION IN ECLAMPSIA.

I RECENTLY attended a woman, aged about 30, in her second pregnancy. Apart from having defective teeth she had a sound constitution. Her first pregnancy was normal. Albumin was found in the urine about the sixth month of the second pregnancy. In spite of treatment she began to suffer from severe headaches, swelling of the legs, and puffiness of the eyelids. On my advice at about the commencement of the ninth month she consented to rest entirely in bed; four days later, during the night, she lost her sight, and several hours later eclampsia set in and labour commenced.

The bowels were emptied by enemata. Labour progressed slowly but normally. On the following afternoon the convulsions became more frequent and violent. At about 3 p.m. I performed venesection (median basilic), removing about 30 ounces; she had two convulsions during the operation, and chloroform was administered. Afterwards no more convulsions occurred, but the patient remained unconscious; labour progressed normally, and at 11 p.m. I found the membranous sac intact protruding from the vagina; the infant was dead. After waiting half an hour I extracted the placenta with difficulty, owing to the fact that the uterus was firmly contracted. There was very little haemorrhage.

She was unconscious for some time afterwards. The blindness lasted all the following day and night; when sight returned it was for some time disordered, but ultimately the recovery was perfect.

I have since assisted at another case of eclampsia where the toxicity was not so intense; the labour progressed quite normally in spite of the eclampsia, and the child was living.

In my experience of eclampsia there is no necessity to interfere with the progress of labour, and certainly not before the third stage; but venesection should be performed, and I think at an early stage; the amount of venous blood to be removed will depend on the degree of toxicity. A record of the average blood pressure in pregnancy and of eclamptics would be interesting, and may be of use in regulating the amount of venous blood to be removed.

I have previously recorded an example of the beneficial effects of venesection when eclampsia persisted after the birth of the child; and when by cutting the umbilical cord after it had been ligatured and allowing it to bleed freely, artificial respiration being used also, the infant's life was preserved.

Bradford. EDGAR W. SHARP, M.B.

Reports of Societies.

THE WAR SECTION OF THE ROYAL SOCIETY OF MEDICINE.

THE first sessional meeting of the War Section of the Royal Society of Medicine was held on October 9th at the Royal Army Medical College, Millbank. The purpose of the meeting, which was attended by more than a hundred members and visitors, was to hear the presidential address of Lieutenant-General Sir John Goodwin, Director-General of the Army Medical Service, but it was announced by Major-General Sir A. P. BLENKINSOP, who took the chair, that Sir John Goodwin was prevented from fulfilling the engagement by reason of his official work in connexion with the Near East crisis.

Sir A. P. BLENKINSOP welcomed the members to Millbank, and went on to review briefly the work of the Section and its future possibilities. There had been a slight increase in membership during the war, but the present membership—a little above 200—was a very small proportion of the members of the medical services. In one of the Commands every officer had lately been asked to join the Section, and had received literature on the subject of its work, but the response had been very discouraging. It would be a thousand pities if the Section were to close down. The various military medical services had much to learn from each other, and there was a good deal to be gained by closer co-operation and a freer interchange of ideas, especially on questions of administration, organization, and medical tactics and strategy. The War Section was the only means, so far as he knew, whereby such co-operation could be brought about. Its designation was perhaps inadequate, and the Council would be glad to receive suggestions for some better name. It was advisable also to establish local branches, if possible, at the larger military and naval stations at home and abroad; and if this scheme were approved by the members of the Section it would be submitted to the Council of the Royal Society of Medicine for its consideration. *The Medical History of the War*, now in course of publication, would be a textbook in the medical services for a long time to come, and the members of the Section would join with him in congratulating the editors; but there was no space in that history for a record of individual experiences or the threshing out of controversial matters, and it was here that the work of the Section might well furnish a useful supplement to the official history.

Exhibits at the Royal Army Medical College.

At the close of the address the members of the Section, by invitation of the authorities of the College, visited the laboratories and museums, where special exhibits had been prepared for their benefit. In the hygiene laboratories there was an exhibit of rations, illustrating the present-day peace ration, the energy value of which was given as 2,497 calories, and another which showed the evolution of the emergency ("iron") ration. This at first consisted of chocolate, with an energy value of 553 calories; in 1913 it was elaborated so that it had an energy value of 2,663 calories, and the present-day "iron" ration, dating from 1918, had 2,800 calories. Some special ration constituents were exhibited, including marmite, germinated pulses (possessing marked antiscorbutic properties), lemon juice (which has now displaced lime juice as an antiscorbutic item in army supplies), and acid drops (which are included in the "iron" ration of the Royal Air Force). The army biscuit of the present day was the subject of another exhibit, wherein it was shown to possess for its weight of one ounce an energy value of 104.25 calories.

Some recent developments in water purification were also shown. Bleaching powder used for water purification and other purposes used to arrive in the tropical countries with the chlorine so greatly diminished, owing to the heat and moisture of the atmosphere, as to make it useless for sterilization purposes. Ordinary bleaching powder, after six months' storage in Egypt, was found to contain less than 1 per cent. of available chlorine. Research has been carried out in the College, and it has been proved that by mixing 20 parts of quicklime and 80 parts of bleaching powder ("chloride of lime") a product results which will withstand tropical climates without deterioration. A specimen of this stabilized bleaching powder had contained 25.2 per cent. of available chlorine when sent out to West Africa, where it was stored under ordinary conditions for a year, and at the end of that time it was found to contain 24.4 per cent.—a loss which is negligible for practical purposes. Tins of the stabilized powder which had been kept in Mesopotamia (Iraq) for twelve months were exhibited, and it appeared that the results here were similar to those in the West African samples.

Among other exhibits were certain recording instruments for motion study and for the measurement of energy expenditure by indirect calorimetry; and in the pathological museum there was a specially arranged exhibit of microscopical specimens illustrating malaria, typhoid, and paratyphoid fevers, plague, its cause and method of infection, trypanosomiasis, and the life cycle of bilharzia. Another series of specimens illustrated the effects on the respiratory passages of phosgene and mustard-gas poisoning.

Reviews.

MEDICINE IN THE WAR.

[First Notice.]

Good progress has recently been made with the publication of the *Medical History of the War*, which is to form part of the *History of the Great War Based on Official Documents*. Nine volumes are promised. The whole series is being prepared under the general editorship of Major-General Sir W. G. Macpherson, K.C.M.G., M.B. The first volume of the series, containing the general history of the Medical Services, was published at the close of last year and was reviewed in our columns of December 17th, 1921 (p. 1047). The first of two volumes dealing with Diseases of the War,[1] with which we now propose to deal, was issued a short time ago, and the first of two volumes on the Surgery of the War reached us recently.

Considering the difficulties which must attend the preparation of the medical history of any campaign Sir William Macpherson and his collaborators are to be congratulated on the appearance of the first volume on the Diseases of the War within four years of the close of hostilities. Other volumes in preparation will deal with the Hygiene of the War, with Pathology and Medical Research, and with Medical Statistics and Epidemiology. Readers of the volume now under notice will do well to bear this in mind, so that they may not look for comment here on the influence of medical considerations on the general strategy of the war. Nevertheless, the form in which the articles are presented is not a bare description of various diseases after the manner of a textbook or journal. It would be impossible for any writer who was an active participant in the campaign to ignore the effects of disease on the troops as effective fighting units. Had such a plan been followed the articles would have merely constituted a sort of bird's-eye view of the state of scientific knowledge at the end of the war and would have proved of quite ephemeral interest. Such a view would have been of little or no value to future generations, and would give small help to those responsible for the conduct of future campaigns. But some such picture of the state of our knowledge was bound to be presented, and the authors of the articles have succeeded in accomplishing this part of their task without undue prolixity or elaboration. Since it is unlikely that in future campaigns even the known causes of disease can be avoided entirely or prevention secured, the measures adopted in the great war for the treatment of disease and for minimizing the resulting invalidism were well worthy of record.

There are, of course, chapters in the history of our medical services which will never be officially chronicled. The failures and difficulties will not be discovered impartially set forth in these volumes. Only the splendid indiscretion of some private memoir is likely ever to lift the curtain from some of the most important episodes in the medical history of the war. After all, posterity will not be particularly interested to know who was responsible for the inadequate ration in Mesopotamia that produced the beri-beri there. It will be enough to know what the ration was that abolished beri-beri. Who selected the malaria-infested terrain of Macedonia for a "side-show" doesn't matter much from the scientific point of view so long as the lessons of the error are borne in mind. The general impression left after reading this volume is that it is the minor and avoidable ailments that cause the greatest wastage in an army. Science has robbed many of the principal scourges of their dangers in spite of popular belief to the contrary. The most notable example is that of enteric fever, where inoculation has been proved capable of rendering whole armies immune, even when infection was present everywhere. In the South African war the admission rate for enteric fever was 285 per 1,000 and the death rate 36 per 1,000 of the average strength in the British army; in France in 1918 the comparable figures were an incidence rate of 0.12 per 1,000 and a death rate of 0.007 per 1,000. In Egypt, where the disease reached its greatest incidence for any theatre, the figures in 1916 were 17.35 and 0.32 respectively. Certain diseases left our troops almost untouched, notably typhus, of which we had only 998 cases in all theatres, and famine dropsy, the only British cases being prisoners in enemy hands.

The outstanding lesson of the war is to be drawn from some figures collected by Colonel Soltau in France in 1917, figures which were corroborated again and again by all observers. The total admissions for sickness in one army during a year numbered 106,267; of these 26,879 were due to what were commonly called "skins and scabies"—that is to say, 25 per cent. of the sick wastage was due to some form of pyodermia very largely preventable by careful inspection and personal cleanliness of the men. The corresponding figures for seven weeks observed in 1918 in another army by the reviewer varied between 18 and 24 per cent. in each week. In addition to the group "skins and scabies," there was a group consisting of pyrexia of uncertain origin, trench fever, myalgia, and rheumatism, which was undoubtedly composed in the main of cases of trench fever, and therefore louse-borne; that accounted for another 26,000 admissions, so that of all the casualties from sickness nearly 50 per cent. were attributable to dirt and vermin.

The editor-in-chief concludes that four great lessons may be learnt from the war:

1. The importance of uncleanliness must be recognized, and an army to be efficient must be kept clean.
2. The value of original research in the field must be realized; an efficient army must carry its medical research units with it.
3. The general staff ("G") must take wastage by sickness into account as much as wastage by wounds. An efficient army must have medical plans no less than military before embarking on a campaign.
4. Hospital treatment in the field must not be rough and ready; the clinical medicine and surgery of war time is susceptible of a high and exquisite perfection, and affords scope for the finest scientific work. In other words, an efficient army depends on its hospitals for reinforcements.

We wonder whether at the Staff College the value of guns and "delousers" is even now reckoned as being about equal. That shrewd old Scots law lord, Kames, remarked that "one cause of the aversion the English had to the Danes was their cleanliness; they combed their hair and put on a clean shirt once a week." We should not forget that the Englishman is extraordinarily conservative; let us hope, as Tennyson said, that "we are each all Dane."

THE HISTORY OF BRAIN SURGERY.

Sir Charles Ballance has published as a book his Thomas Vicary lecture, *A Glimpse into the History of the Surgery of the Brain*.[2] This lecture has already appeared in condensed form in our columns, but no doubt many readers will take the opportunity now afforded them of reading this brief history in its extended form. Sir Charles Ballance writes with his accustomed erudition and with becoming enthusiasm for the masters of bygone times. Beginning with the dawn of surgery in prehistoric times, we come through Mesopotamia and Egypt to surgery in Greece, and from there by easy stages down to our own country and our own times. Brain surgery appears always to have excited interest, but, like the surgery of other regions, its history is rather the history of the application of certain general principles to a special region. These may have been, and indeed were, often merely fashions or modes in surgery; some have rested on sure foundations and have stood the test of time. This part of the text is illustrated by several diagrams of tools used in ancient times, amongst them a brace, bit, and burr of the sixteenth century, very similar to the Doyen instruments in common use to-day.

It is not by advances in the design and manufacture of instruments that surgery has reached its present state, although from time to time an instrument is designed (such as the Albee saw) that gives greater possibilities, that makes operating easier. For this reason it is not until recent times, when precise knowledge of pathological processes began to be understood and the doctrine of localization of function was appreciated, that brain surgery in its modern sense can be said to have made a beginning. It is true that surgical writings dating back almost to the dark mists of time refer almost without exception to injuries of the head, and also often to infections of the skull and brain.

[1] *The Medical History of the War Based on Official Documents: Diseases of the War.* Vol. i. Edited by Sir W. G. Macpherson, K.C.M.G., with the assistance of Sir W. P. Herringham, K.C.M.G., Colonel T. R. Elliott, C.B.E., D.S.O., F.R.S., and Lieut.-Colonel Andrew Balfour, C.B., C.M.G. London: H.M. Stationery Office, or through any bookseller. 1922. (Medium 8vo, pp. viii + 550; 6 coloured plates and other illustrations. £1 1s. net; post free £1 2s.)

[2] *A Glimpse into the History of the Surgery of the Brain.* The Thomas Vicary Lecture, delivered before the Royal College of Surgeons of England, December 8th, 1921. By Sir Charles Ballance, K.C.M.G., C.B., M.V.O., M.S.Lond., F.R.C.S. London: Macmillan and Co., Ltd. 1922. (Demy 8vo, pp. 110; 30 figures. 10s. 6d. net.)

But interesting as these processes are, and far though we may be even to-day from a victory over them, we have reached more knowledge of these and of their treatment than we have, say, of tumours and of hydrocephalus. As one turns over the pages of this book we read of discoveries, their often inexplicable neglect, and of rediscoveries; amplifications and amendments follow one another over the years in the manner with which all students of medical history are so familiar. There passes also before one's eye the great pageant of names—men famous in their day, famous for all time in the pages of history.

The passages on the great discoverers of the past forty years will be read with the greatest interest. And we could wish that Sir Charles Ballance had expended more space upon them. We can only hope that he will do so in the future. He speaks nobly and loyally of the men of his own day—"And where is it possible to discover in all the world or in all time another group of names of Alpine altitude in neurology such as our country can produce in Jackson, Schafer, Ferrier, Gowers, Sherrington, and Horsley?" At this point some of the younger men amongst us may be heard to sigh for a Lytton Strachey to tell us more about them. But, great though the names of the last two generations undoubtedly are, there is still so much to learn and still so much to do that new names may prove themselves worthy to be written with those of the great past.

X-RAY DIAGNOSIS IN MEDICINE.

THE second edition of the treatise on the use of x rays in clinical diagnosis[3] by Professor ASSMANN of Leipzig has followed quickly on the first, which was reviewed in our columns on January 28th (p. 148). As he is in a position critically to survey the whole field and to write with considerable authority upon the interesting problems of diagnosis by x-ray examination when used in combination with other well-established methods, we propose now to give a somewhat fuller account of his views.

The book is very big and expensive, but as it is a reasoned piece of clinical work in the composition of which the x-ray examination has been employed to the full it deserves study.

The opening chapters are devoted to a consideration of the normal and morbid conditions of the heart. The technique is very well described, and the text is illustrated by diagrams and skiagrams which leave nothing to be desired in lucidity. The combination of anatomical drawings and tracings reprinted from the fluorescent screen image adds greatly to the value of the interpretation of the normal and morbid appearance. Moritz and Groedel's work receives full appreciation, as does also the brilliant work of our French contemporaries Vaquez and Bordet. The chapter concludes with a reference to the blood vessels. A good example of arterio-sclerosis of the vessels of the leg shows how useful the x-ray examination may be.

An excellent section on the mediastinum and the lungs follows; then in order are reviewed the conditions met with in disease. Full consideration is given to the differential diagnosis of these conditions, and the x-ray appearances are described and illustrated by diagrams and excellent skiagrams. The various inflammatory lesions of the pleura are discussed and tumours of the lungs and chest are fully dealt with. An excellent chapter is devoted to the diaphragm. Special mention may be made of the records of tuberculous conditions; a number of good radiograms are given to illustrate the typical appearances. Tumours of the thorax are discussed at some length. A study of the part of the book dealing with the pathological conditions encountered in the region of the oesophagus will reveal the complexity of the subject and the practical difficulties encountered in diagnosis; the consideration of this important structure is always of importance, and the worker in radiology cannot fail to appreciate the value of an intimate acquaintance with the possible lesions and their significance when seen in the x-ray picture. Pouches of the oesophagus are well illustrated and the differential diagnostic points clearly set out.

The normal stomach and intestines are next discussed, and a full description of the x-ray appearances in disease follows. The important lesions of the stomach and duodenum are exhaustively discussed, and what the author has to say on the diagnosis of gastric ulcer, hour-glass contraction of the stomach, and new growths of that organ, provides profitable reading. The illustrations of a number of conditions commonly met with are good, and their value has been increased by the inclusion of a diagram placed opposite the skiagram; this plan brings out clearly the salient feature which leads to the diagnosis. This section contains a short article on the pancreas, its lesions, and their bearing upon gastro-intestinal diagnosis generally. The method of producing pneumoperitoneum is described and its value in diagnosis dealt with. The examination of the gall bladder is described and the diagnosis of gall stones briefly discussed. The urinary system receives scant attention, and the nervous system is also dismissed very briefly, although the diagnosis of intracranial lesions is dealt with and the sella turcica and pathological condition in it are well dealt with.

The book on the whole is good; much careful work has been given to its compilation, and an enormous amount of clinical material has been sifted in order to obtain the required diagnostic data. The author has brought to his aid a ripe experience in the study of internal diseases; this is obvious throughout the work, and amply proves that if the best is to be expected from x-ray examination a radiologist must have a full clinical experience. The illustrations have been carefully selected, are of high quality, and have been on the whole well produced. The book can be confidently recommended to all who are interested in the subject. Readers will, however, look in vain for any reference to British work. No doubt in following editions this fault will be remedied.

[3] *Die Klinische Röntgendiagnostik der Inneren Erkrankungen.* By Professor Dr. Herbert Assmann, Leipzig. Second revised edition. Leipzig: F. C. W. Vogel. 1922. (Imp. 8vo, pp. 735; 711 figures, 10 plates. 108s.; bound, 120s.)

MERCHANT SEAMEN.

IN writing a book on the health and welfare of *Merchant Seamen*[4] Fleet Surgeon W. E. HOME, R.N., has been moved by a desire to place before the public the many hardships the men of the mercantile marine suffer and the many grievances under which they labour. The author, who has a considerable personal knowledge of the subject, displays great sympathy with the men; there is no doubt that in the smaller ships the state of things, even to-day, is often very bad and in most compares unfavourably with conditions existing in the Royal Navy. Though the views expressed in the book may be rather too sweeping, for the larger lines have very competent medical advisers and able medical officers, yet the fact remains that, of 10,000 ships on the British Register, less than 600 are required to carry a surgeon. In a paper on the health of seamen on board ship, communicated to the Section of State Medicine of the Royal Society of Medicine by Dr. Arnold Chaplin, medical inspector of the P. and O. Company, he observed that questions of hygiene were mostly subordinated by owners to other factors; and his insistence upon the desirability of subjecting all plans of new ships to a competent medical officer before construction was supported by Dr. Willoughby, medical officer of health for the Port of London. Dr. Chaplin also directed attention to the frequent absence of hospital accommodation and isolation wards. All these points are also insisted upon by Dr. Home. The position of the crews' living quarters is an open question, but those even now provided in small ships are frequently abominable, and the ventilation inadequate. The very outspoken description of the conditions seen in some temporary cruisers during the war by Admiral Boyle Somerville, R.N., strongly supports Dr. Home's views. Many bills designed to improve the health conditions for seamen afloat have been introduced, but if anything effective is to be done the matter should, we think, be taken up by the Ministry of Health; in this connexion the constructive suggestions made by Sir Robert Hill, K.C.B., K.C.M.G., medical director-general of the navy, will be found of great value. The deplorable methods of recruiting seamen and of treating them when afloat which prevailed in the last century are giving way to more enlightened views, and it is being better recognized that even on financial grounds alone it pays to keep the men healthy, to provide them with amusements, rational treatment on board, and sailors' homes when on shore. Dr. Home's book is to be welcomed as a valuable contribution to the attainment of these objects. Much, however, remains to be done to arouse public opinion, and we welcome this book, which not only describes abuses but also suggests remedies. Statistics are at present very unreliable, and little comparison can be made with those of the Royal Navy, which starts with first-class lives.

[4] *Merchant Seamen, their Diseases and their Welfare Needs.* By W. E. Home, O.B.E., M.D., D.P.H., M.R.C.P.E., Fleet Surgeon Royal Navy. London: John Murray. 1922. (Cr. 8vo, pp. ix + 111. 5s. net.)

RURAL CHILD WELFARE IN AMERICA.

The National Child Welfare Committee of the United States has been conducting an inquiry into rural child welfare, and the results are embodied in a volume[5] by eight contributors, published under the direction of Edward N. Clopper, Ph.D. The purpose, as stated in a prefatory note by the Secretary to the Committee, is twofold: to present a graphic picture of rural life in America so as to lead the public to realize the needs of country children; to trace the causes of defective conditions described and to suggest a preventive and remedial policy. The purpose is well fulfilled, and the several chapters fit into each other so as to present as complete a picture of child rural life in America as could be contained within the limits of the book.

The area selected for inquiry was Western Virginia. Many factors enter into the problem. The education of parents is often very defective. A coal mine operator told Dr. Clopper that he had hired 144 native-born white men living near his property and only 11 of them could sign the pay roll. That, however, was doubtless exceptional, as Mr. C. E. Gibbons, whose subject is the Rural Home, found that only about 20 per cent. could neither read nor write. The number of children engaged in agriculture nearly doubled between 1880 and 1890, and further increased by about a half in the next decade. The assumption that a country child living at home is ideally situated is held to be erroneous. It is well urged that a clear distinction is to be drawn between child labour and "children's work." A system of clubs has been instituted for promoting the latter, by development of head, hand, heart, and health, a four-leaved clover being the emblem of what is known as a Four H Club. Indifference to education, especially to school attendance, is manifested, not only by parents and children, but by the whole community. At the same time the standards for teaching are low, there is a shortage of teachers, and their scale of pay has been insufficient, though improvement is being made. Owing to sparsity of population there are a great number of small schools with only from ten to twenty pupils on the roll, and the school sessions are sometimes too short. Reform of these defects is pressed for in the chapter on the subject. Recreation is advocated in an eloquent chapter and the following statements are quoted from Wood:

"Children love play as all young beings love life, because life is play. The child's life is one of physical, mental, and moral development. Development means self-expression, self-expression means activity, and activity means play. Children do not play deliberately from ulterior motives; with them it is play for play's sake; play is life, they live to play; they are children because they play."

But the value of play is commonly not appreciated either by parents or farmers, and in a family poorly off a child's earnings count for much. But—and this will be unexpected by most readers—it is held that the common belief in the healthiness of farm work is hardly justified by facts. Muscular strength may be acquired, but there is little of the vigour of heart, lungs, or digestion, produced by exercise, and the boys and girls are apt to be round-shouldered and flat-chested. This, however, may be due to want of adequate play. An important chapter deals with dependency, neglect, and delinquency. It is indicated that much improvement is required in the organization of relief work where poverty and parental neglect are in question. Touching stories are told of the plight of tramp children from "broken homes" and of the failure of guardians to realize their responsibilities. Rural folk, however, show a warm hospitality towards homeless children, and kinsfolk are the first to receive them when separated from their parents. The causes and actualities of delinquency are discussed, and the relative action by the authorities concerned. The chapters devoted to taxation and to the State and the child are informative and suggestive. One item of what in this country we would call grandmotherly legislation may be quoted.

"It is a crime to sell or give to any child under 21 years of age any cigarettes or cigarette paper, or to sell, give, or furnish tobacco in any form to a child under 16 years of age, or for any child under 21 years of age to make or have cigarettes or cigarette paper; and it is made a part of the duty of all peace officers to enforce this law against the use of cigarettes."

Prohibition in the States is clearly not confined to the use of alcohol, and the great democracy has no hesitation in interfering with individual liberty where the interference is regarded as for the public good.

The whole book is packed with material alike interesting and valuable to all who are concerned with the broad principles of child welfare as they apply to rural areas; and the committee responsible for the volume is to be congratulated on the outcome of its labours.

[5] *Rural Child Welfare.* Issued under the direction of E. N. Clopper, Ph.D. New York: The Macmillan Co. 1922. (Cr. 8vo, pp. 355; illustrated. 14s. net.)

NOTES ON BOOKS.

A revised edition (the ninth) has appeared of the popular little *Aids to Forensic Medicine*,[6] originally written by Dr. William Murrell, physician to the Westminster Hospital, and since his death edited by Dr. W. G. Aitchison Robertson, lecturer on forensic medicine in the Extra-Mural School of Medicine, Edinburgh. In its new form the work will no doubt prove as useful to students preparing for examination as it has in the past. Among the added matter is a paragraph briefly summarizing the medical requirements imposed by the regulations under the Dangerous Drugs Act, 1920. There is also a note on the Proprietary Medicines Bill, which was introduced by the Government two years ago, and is (in Dr. Robertson's optimistic view) "likely soon to become law." The paragraph on professional privilege in courts of law (p. 8) is as concise as it is unemotional.

A pamphlet of forty pages, entitled *Four Sanatorium Lectures*, has been prepared by Dr. H. O. Blanford for the use of patients who are undergoing a course of sanatorium treatment at Midhurst, and the author hopes it may be welcomed by a wider public. The rationale of the routine is explained, the system of graduated exercise described, and advice with regard to the ordering of home life after leaving is proffered. The aim throughout is to enlist the intelligent co-operation of the patient, and to induce him to view his trial with equanimity and hope. We would offer but one word of criticism. The dictum is very forcibly laid down that in pulmonary tuberculosis "the only vehicle of infection is sputum, which contains the tubercle bacillus." Now, however advisable it may be to stress the infectivity of the sputum, it is useless to do so without at the same time laying emphasis on the dangerous nature of the cough spray which accompanies the expectoration of that sputum. If there is one thing which bacteriology has shown clearly during the past few years it is the importance of spray infection in the spread of respiratory diseases; and to allow a patient to cough and sneeze promiscuously without a handkerchief in front of his mouth—as actually occurs at some of the best sanatoriums—is to give him a poor education in his duties to the public with whom he is subsequently to come in contact. If a further edition of this useful booklet should be called for the author might well correct the unduly large number of spelling mistakes and misprints which somewhat mar his first effort.

It is now nearly twenty years since the late Rakhaldas Ghosh published the first edition of his *Treatise on Materia Medica and Therapeutics*.[7] In designing this wonderfully compendious little book the author, we believe, had sympathetic encouragement from the late Sir Pardey Lukis. Its appreciation by students and practitioners is proved by the recent issue of a ninth edition. The contents have been revised throughout by the present editors, Lieut.-Colonel B. H. Deare and Dr. B. N. Ghosh, and various minor changes in arrangement have been made; but the size of the volume has only been increased by three pages since the eighth edition appeared two years ago. This work remains one of the most useful and practical of the smaller reference books on the properties, actions, and uses of medicinal preparations.

Professor Sollmann of Cleveland has issued a second edition of his *Manual of Pharmacology*.[8] Since the first edition, which was reviewed in our columns on December 29th, 1917, much work has been done, but, as the author admits in his preface, there has not yet been time thoroughly to digest all the material. He has, however, found it possible to make many additions and corrections. The sections on irritant gases have been expanded by the introduction of references to their use in the war. A useful feature of the book is a bibliography occupying 79 pages; it has been enlarged in this edition by the addition of over 1,200 titles.

[6] *Aids to Forensic Medicine and Toxicology.* By W. G. Aitchison Robertson, M.D., D.Sc., F.R.C.P.E. Ninth edition. London: Baillière, Tindall, and Cox. 1922. (Fcap. 8vo, pp. xii + 155. 3s. 6d. net.)

[7] *A Treatise on Materia Medica and Therapeutics, including Pharmacy, Dispensing, Pharmacology, and Administration of Drugs.* By the late Rakhaldas Ghosh. Ninth edition by Lieut.-Colonel B. H. Deare, C.I.E., I.M.S., and Birendra Nath Ghosh, F.R.F.P.S. Calcutta: Hilton and Co. London: Simpkin, Marshall, and Co., Ltd. 1922. (Cr. 8vo; pp. 712. 10s. 6d.)

[8] *A Manual of Pharmacology and its Applications to Therapeutics and Toxicology.* By Torald Sollmann, M.D. Second edition. Entirely reset. Philadelphia and London: W. B. Saunders Company. 1922. (Roy. 8vo, pp. 1066; 29 figures 32s. 6d. net.)

Miss MARY B. EYRE, who is President of the Colorado Board of Nurse Examiners, has written a volume, *Psychology and Mental Hygiene for Nurses*,[9] which should be useful to the increasing number of nurses engaged in public health and welfare work. Such work takes the nurse into the homes of the people, and the author feels that an understanding of the principles of psychology and its applications to daily problems will greatly extend her sphere of influence. The book provides an elementary but systematic account of general psychology, the psychology of childhood, the subconscious mind and the forces which determine human behaviour, and the principles of mental hygiene in relation to nursing. Each chapter includes a useful summary of its contents, and the subject-matter is presented throughout with commendable clearness.

The *Durham University Calendar*[10] for the year 1922–23 has just been issued; the general arrangement follows the plan adopted in previous years. Full information is given regarding the University of Durham College of Medicine at Newcastle-on-Tyne, and the rules for students attending the Royal Victoria Infirmary are set out.

[9] *Psychology and Mental Hygiene for Nurses.* By Mary B. Eyre, R.N. New York: The Macmillan Company. 1922. (Cr. 8vo, pp. 208; 9 figures. 7s. net.)

[10] Newcastle-on-Tyne: Andrew Reid and Co., Ltd. 1922. (Cr. 8vo, pp. 756. 3s. 6d. net; by post 4s. 3d.)

Nova et Vetera.

"THE ENGLISH SPAW" AND "THE COLDE SPRING OF KINGHORNE CRAIG."

UP to the close of the sixteenth century the term "Spa" was given solely to the little town to the south-east of Liège in the Ardennes, where people went to drink the waters of the Pouhon, La Sauvenière, and the other springs. In the next century, however, the word "spa" began to be used in a generalized sense of a medicinal or mineral spring anywhere; and Dr. Timothy Bright (1551–1615) did something to extend its employment in this way by naming the Tuewhit Well at Harrogate, in the Forest of Knaresborough, "the English Spa." The well had been discovered about 1571 by a Mr. William Slingsby, who had travelled abroad and knew the taste of the fountains at Spa; he did "drink the water every yeare after all his life time," and was of opinion that "it was much better, and did excel the tart fountaines beyond the seas." With such a treasure in our own Yorkshire, said Dr. Bright, why go to the "German Spaw"?

Others were of the same opinion; and so, in 1626, Dr. Edmund Deane of York wrote his little book[1] called *Spadacrene Anglica, or The English Spaw Fountaine*, a short review of which was published in the JOURNAL of August 12th (p. 272). In the preface, "to the physitians of Yorke," Deane wrote: "Though it was my fortune first of all to set a new edge on this businesse; yet my journeyes to this Fountaine have not been made without your good companies and association, nor the several tryals had there, and at home performed without your worthy helpes and assistance; nor this little Treatise begun without your instigations and incitements."

Of one of these "journeyes" with Deane to the Well, Michael Stanhope gave a partly humorous account in his *Newes out of Yorkshire*, published in the same year (1626) as the *Spadacrene Anglica*. There were three "physitians"; Stanhope was enthusiastic: "first of all I dranke of it and finding it to have a perfect Spa relish (I confesse) I could not contain but in a tone louder than ordinary I bad them welcome to the Spa." The "physitians," on experiment bent, mixed in a glass the powder of galls with the water to see if it would "turne to a Claret die"; "wherein they were not deceived, for presently (to their both wonder and joy) the water changed colour and seemed to blush in behalf of the Country, who had amongst them so great a jewell and made no reckoning of it."

Deane's book is the first work on the waters of Harrogate. It passed through four editions, all of them now very rare, and the profession is indebted to Dr. James Rutherford for reprinting in this present year the first of them, that of 1626, and to Dr. Alexander Butler for supplying biographical notes. The reprint is welcome also because it corrects some errors which have crept into the story of early days at Harrogate when that place was a mere hamlet in the Royal Forest of Knaresborough. Among these was the statement that the discoverer of the well was Sir William Slingsby. It was really his uncle, Mr. William Slingsby, born in 1526 or thereby, to whom this honour must be given. Deane's book was published in 1626, so was Stanhope's *Newes*, whilst Slingsby's birth was in 1526; so here are two tercentenaries and one quatercentenary rapidly approaching, and Dr. Rutherford's reprint prepares the way for their fit celebration some four years hence at "The English Spaw."

The Tuit or Tuewhit well at Harrogate was so called, Stanhope thought, "for no other cause but that those birdes (being our greene Plover) do usually haunt the place." The water was chalybeate, like that at the German Spa; and Deane enumerated a long list of maladies in which it worked wonders. It was, for instance, of much profit "in the inveterat venereous Gonorrhoea"; it cured sterility and the tendency to miscarry, but curiously enough it was not to be used by expectant mothers; it was efficacious in worms, killing and expelling them, and letting and hindering the breeding and "new encrease of any moe;" it was "very availeable" against the stone in the kidneys; and it helped the black and yellow jaundice, and "the evill which is accompanied with strange feare and excessive sadnesse without any evident occasion, or necessary cause, called *Melancholia Hypochondriaca*." The waters, however, were not to be taken without the advice of the physician, for this reason: "Medicines are not said to be *Deorum manus*, that is the hands of the Gods . . . or *Deorum dona*, that is the gifts of the Gods . . . till they be fitly applyed and seasonably administered by the counsell and advice of the learned and skilfull Physitian." For instance, there were those who thought it dangerous to take purgatives and the water of the well in the Dogge-dayes; the same opinion was held about blood-letting. Deane wrote that there was here an old and inveterate error, "which in all probabilitie hath cost moe Englishmens lives, then would furnish a royall army, in neglecting those two great helpes or remedies, to wit, Purging and Blood-letting in hot seasons of the yeare, which in all likelihood might have saved many of their lives; while expecting more temperate weather, they have beene summoned in the meane time, or *interim*, by the messenger of pale death to appeare in an other world." Wherefore, concludes Deane, away henceforth with the scrupulous conceit and too nice fear of the Dog-days.

Deane's *Spadacrene Anglica*, therefore, was an early work on mineral waters in Great Britain; but there was an earlier, for in 1618 Patrik Anderson, "Doctor of Physick," published in Edinburgh *The Colde Spring of Kinghorne Craig* (in Fife), *his admirable and new tryed properties, so far foorth as yet are found true by Experience.* Of this rare pamphlet there is a copy in the library of the Royal College of Physicians in Edinburgh. It was dedicated to "the Right Noble and Illustrious Lord, Johne Erle of Mar, . . . Lord High Thesaurer of Scotland, Knight of the most noble ordor of the Garter, and one of his Maiesties most honorable Privie Counsell, of both Kingdomes"; and the author generously wished to the noble Lord and his most noble Ladie "a great portion of Methusalems yeeres for this lyfe, and, after it, eternall life."

There is much that is of interest in the pamphlet (something may be extracted from it again), and a rough illustration shows "the craig" itself, which is thus carefully described and located: "hard by the shore syde of Kinghorne, within a bowdraught or more to the heaven of Prettie-cur where the Botes arrive, direct west the Sands, is a great round steip Rock." Andersen, like Deane, enumerates many things for which this "fair spring (albeit but laitlie knowne)" was useful; and he addresses his readers—"Goe then with boldnesse, and drinck of this wholsome and Physicall water, and say not to yourselfs, the Physitions envyeth it, speaketh against it, they approve it not, and it hindereth their gaine; onlie but carie with you these few directions following, and so faire yee well." Some of the directions are like those for the Spadacrene Anglica, but there was at least one special injunction, the swallowing of eight or nine of the author's *grana angelica*, "hid in a rere [that is, half-cooked] or potched egg." Both the Fifeshire and the Yorkshire spas were famous in the early part of the seventeenth century; but a very different fate has befallen the cold well at Kinghorn when contrasted with that of the Tuewhit Spring at Harrogate. Groome's *Ordnance Gazetteer of Scotland* (1901) has this sentence, "the medicinal well has now for many years fallen into neglect."

J. W. B.

[1] *Spadacrene Anglica, or The English Spa Fountain.* By Edmund Deane, M.D.Oxon. The First Work on the Waters of Harrogate. Reprinted with Introduction by James Rutherford, L.R.C.P.Ed., and Biographical Notes by Alex. Butler, M.B. Bristol: John Wright and Sons, Ltd. 1922. (Pp. 128. 6s. net.)

British Medical Journal.

SATURDAY, OCTOBER 14TH, 1922.

RADIATIONS IN GYNAECOLOGY.

THE paper in which Dr. Robert Knox introduced the discussion on the treatment of gynaecological conditions by *x* rays and radium in the Section of Obstetrics and Gynaecology at the Annual Meeting of the British Medical Association in Glasgow is published this week (p. 678). It was an able and quite impartial address, and led to a brief but very interesting discussion.

Putting aside the smaller things, the main points in the discussion related to malignant disease and fibroids: should radiation treatment be used for these conditions in preference to surgical? The opener laid down the principle, with some degree of emphasis, that "in all cases which are suitable for surgery, surgery should be recommended." The general consensus of opinion with respect to fibroid disease also was evidently in favour of operation, reserving *x*-ray treatment for cases in which for one reason or another operative treatment was inadvisable. With this opinion we will not quarrel, but at the same time it should be remembered that it is not universally accepted, and that men like Béclère of Paris, whose experience is very large, publish long lists of cases treated safely and successfully with *x* rays.

The real subject under discussion, however, was the question of radiation treatment in malignant disease of the cervix and uterus, and the prominence which has of late been given to this subject by the claims of the Erlangen school. At once a difficulty arises, for in this country, at any rate, the cases so far allocated to both radium and *x*-ray treatment, singly or combined, have been those which have reached the stage in which they have been pronounced to be inoperable. In Bavaria, on the other hand, many cases in the operable stage—which of course is an earlier stage of the disease—have been selected for *x*-ray treatment. It follows that statistics and results are not comparable. The question arises whether, with the increasing evidence of beneficial results in inoperable conditions, we are not reaching the stage when the position as between the knife and radiations should be impartially considered at a much earlier stage of the disease. Can there be any doubt that in many respects the knife as a cure for cancer—uterine or otherwise—is a ghastly failure? Those in charge of *x*-ray departments of large hospitals for the last fifteen or twenty years have had an experience in which the failure of operations has been brought home to them in no uncertain manner. Breast carcinoma, which on the face of it, from early diagnosis, visibility, ease of access, and so on, should lend itself to operation, and should furnish results more favourable than more deeply seated malignant disease, is not pleasant to contemplate from the point of view of the radiologist as he sees the late after-results sent to his department as "a last hope." This being the case, what can be said for the operative treatment of the more deeply seated, more inaccessible, and probably less early diagnosed growth?

There can be no doubt that the work of Wintz and Seitz has given a great stimulus to *x*-ray therapy, and it is possible that in the future it may lead to still further developments. The whole technique has been placed on much firmer ground than hitherto, and this is especially the case as regards dosage; but much more than this has been claimed, and a definite lethal *x*-ray dose for various conditions, and especially for the cancer cell, has been stated. That this position cannot be maintained is now becoming obvious, for if there is a definite lethal dose for the cancer cell then the cure of cancer, or at any rate of the primary cancer manifestation, should be a mathematical certainty. This is far from being the case, unfortunately, and it is recognized on all hands that many other factors—for instance, the character of the cancer itself, to say nothing of its host—have a considerable bearing upon the assertion. It has also been laid down as an axiom that there is such a dose as a stimulating dose for the cancer cell. Actual proof of this from a clinical, and not a laboratory, point of view has not been established; every radiologist has seen secondary cancer nodules disappear rapidly and entirely after receiving what Wintz and Seitz state to be stimulating doses. The problem is not quite so simple as all this.

Dr. Knox asserts positively that the statistics which have been published on *x*-ray treatment in carcinoma of the cervix do not encourage us to support the claims in favour of *x* rays as against those of surgery. This, unfortunately, appears to be a principle from which we cannot depart, at any rate at present, and it means that radiation treatment must still be restricted to the inoperable condition. An important fact which should not be overlooked is that, notwithstanding the original claims of success in the *x*-ray treatment of cancer of the cervix, Wintz has considerably modified his technique, inasmuch as he now resorts to a long preliminary ionization of the growth before proceeding to administer the lethal *x*-ray dose. Further, many other workers consider that the primary growth should be treated by the introduction of radium needles, again as an adjunct to the large measured *x*-ray dose; Dr. Knox himself is strongly in favour of the plan. These facts go to show that we are still far from having perfected that ideal method of *x*-ray treatment which was heralded with much beating of drums and blowing of trumpets so short a time ago. It should also be remembered that, after all, *x*-ray treatment and surgery aim at the same thing—namely, the removal of the primary growth and the treatment of the adjacent lymphatics and glands likely to be affected. Neither, in any way, attempts, or can attempt, to deal with the still greater problem—namely, the prevention of distant metastases. What if it should turn out that in the large majority of cases, by the time the primary manifestation has become evident, the disease has already become a generalized condition, and that only some resistance, with which we are at present unacquainted, prevents the metastatic growths from appearing almost at once; that once infected, at any time, on this resistance breaking down generally or locally, general or local recurrence may occur, and this at any period of time after an operation, be it by the knife or by radiation? To put a fixed time, even five years, and say that if patients survive that time after the removal of a primary growth without recurrence they are cured is not logical. Perhaps we may more rightly say that a case once recognized is never cured, and that the potentialities of a recurrence, locally or in the metastatic form, are always present. Then if the patient dies of something else before recurrence takes place he has been cured; if, on the other hand, he lives long enough, recurrence would seem to be almost inevitable. The cure of cancer and malignant growths generally can only follow, if it does follow, on a complete knowledge of the cause and life history of the disease, and this cure will not mean merely dealing with a primary growth and its immediate surroundings.

The cost of *x*-ray treatment was alluded to by some of the speakers, and the opinion was expressed that the great drawback to radiation treatment generally was that it was so expensive. The obvious reply to this criticism would be to compare its cost with that of surgery. The cost of effective radiation treatment ought

not to be, and is not, as great as that of a major surgical operation, which by no means comes to an end with the fee of the operating surgeon. *X*-ray treatment does not mean a lengthy stay in an expensive nursing home, the fees of nurses for many weeks, and so on. If a case is operable, expense does not stand in the way of operation. If a case is pronounced inoperable and radiation treatment can hold out reasonable hopes of a prolongation of life under conditions which make it worth while to the patient, then the fees usually paid can hardly be said to be excessive. Skilled radiologists, competent to carry out the modern treatment of cancer by *x* rays, are at the present time few, very few, in number. It takes anything up to six or eight hours to treat a case of cancer of the cervix, and practically the private practitioner has to give the one case his personal attention for this length of time. Would a surgeon be content with the fee he now gets for a similar length of service? Moreover, the radiologist has to use apparatus which costs about £1,000, and apart from this his running expenses are at least as great as those of a surgeon. No, the cost is not excessive, and if the time comes (and it may possibly come very soon) when radiation is found to be preferable to surgery for the treatment of many primary growths, the patient will stand to gain pecuniarily rather than lose, if everything is taken into consideration. A far more important point than expense is choice of operator. A very large number of the profession, and the public generally, seem to consider the possession of apparatus the sole qualification for successful and safe *x*-ray work. It is in this direction that a word of warning has become essential. It is not too much to say that the choice of a radiologist to carry out treatment in these life and death cases should be made with at least as much care as when an operating surgeon has to be chosen.

THE WASTAGE OF CHILD LIFE.

The September issue of the *Glasgow Medical Journal* contains a valuable study of mortality rates in Glasgow families by Miss Jean Agnew, working under a grant from the Medical Research Council. The article has an introduction by Dr. Leonard Findlay. The material used is from two sources: one, the histories of 1,768 poor families as medically recorded at the Royal Hospital for Sick Children (the fine institution visited by many members of the British Medical Association during the recent Annual Meeting in Glasgow); the other, the figures relating to 455 well-to-do families, taken from the private case records of a consulting paediatrist. In the poor families the total number of pregnancies was 9,763, which, including stillbirths and twin-births, yielded 9,954 "possible" lives, the average family therefore consisting of 5.6 possible lives. The corresponding figures for the well-to-do families were 1,440 possible lives, or an average of 3.2 per family.[1] These are the data on which the calculations and the classification of types of wastage are based.

As charted, it appears that in respect of miscarriages and stillbirths the well-to-do families are no better off than the poor families. In fact, if these data are to be relied on, the wastage is slightly higher in the former. If practical equality in this respect were established on a sufficient basis of fact it would tend to show that at the beginning of life the poorly-off mother is just as safe a child-bearer as the mother in comfortable circumstances. Also the difference in favour of the well-to-do class shows only very slightly in the first month of life, so that the baby of poor parents seems as healthy as the baby of parents who are better off. But before the end of the first year the difference is very apparent, and becomes much more obvious later on when all deaths are compared. Also the disadvantage of the poorer families is greatly magnified when pregnancy succeeds pregnancy, as shown by the increase in the infantile death rate. This does not take place in the larger families of the prosperous, who are able to give as much care and attention to children born later in wedlock as to the earlier births. There is, however, a curious reservation here, arising from one chart relating to the richer families, which seems to indicate that "the best chance of survival lies with the result of the third pregnancy." The reader may ask himself, What can be the explanation if this be really so? Can it be that skill in mothercraft has by that time improved, so that risks to which the first and second babies may have been unwittingly exposed are avoided in the case of the third? But if so, why should not the fourth be still better guarded? Is it possible that, the average well-to-do family being 3.2, the fourth and later pregnancies, where they occur, are somehow under less favourable conditions, say, as to the age and health of the mother? The average age at marriage in the middle class is certainly higher than among the poor, and the optimum time for child-bearing may have been reached in the third pregnancy. That, however, is highly speculative.

Miss Agnew attributes the bad record of the poorer families to increased overcrowding, lessened outlay on food per head (at least until the older children become wage-earners), lessened maternal care, lessened cleanliness, and the like. Some of the charts show the results in the poorer families up to twenty pregnancies, and a comparison of New York data with those of Glasgow brings out a remarkable similarity. The last paragraph of her report is as follows: "From among much that is suggestive, one fact that is definite emerges. In the large poor families—no figures are available for well-to-do families of similar size—probably from the fifth, and certainly from the seventh pregnancy, the wastage is so great as to indicate that—be the cause what it may—the additional members of the family are bought at a cost in human life and suffering which cannot be regarded as equitable, whether viewed from an economic or from a humanitarian standpoint."

[1] In Table I the two percentages seem to have been accidentally transposed, and appear at the head of the wrong columns.

SHORTAGE OR OVERCROWDING?

It was with some surprise that we read last week the following passage in a leading article in a London daily newspaper on the reopening of the medical schools: "We are glad to learn that the profession is attracting young men and women in greater numbers than of late, but something has yet to be done before the schools can muster as many students as before the war. That the nation needs more is sufficiently obvious. The natural increase of population alone would call for more practitioners. . . . That the war and the sequel of the war should have diminished the numbers of recruits was inevitable." This is not accurate; in fact, it is almost the opposite of the truth, as may be recognized by anyone who has studied the figures given in our Educational Number of September 2nd. The fact is, of course, that there was a great increase in the numbers of medical students during the war and a much greater increase after the armistice. In 1919 the new students who registered in Great Britain and Ireland numbered 1,100 more than the "record" entry of 1891. In 1920 the entrants were still greatly in excess of any pre-war year, and it was only in 1921 that the number of new students began to approach the normal. During the thirteen years before the war the annual entry of first-year medical students in the United Kingdom averaged 1,400; in 1921 the number was 1,808. In consequence of the great numerical increase in the student body during and after the war many of the schools throughout the country

became overcrowded, and some were obliged to turn away applicants. It is a mistake, therefore, to say that "something has yet to be done before the schools can muster as many students as before the war." On the contrary, the recent fall in the entries has been a great relief to the overstrained teaching institutions. Nor is it by any means obvious that "the natural increase of population calls for more practitioners"; the general tendency through the past forty-five years has been towards an increase in the ratio of doctors to population. While the population of Great Britain and Ireland has increased by about 50 per cent. during that time, the number of registered practitioners has been doubled. In view of all these facts, it is plainly undesirable to suggest to the public that there is a shortage of recruits for the medical profession. Indeed, the number of new students has been so excessive in recent years that, had the torrent not been stemmed last year, there was a certainty that within a short time the profession would be seriously overcrowded. The return to a more normal entry has therefore been welcomed, not only by the overburdened schools, but by those who, like ourselves, felt apprehensive lest there should not be work enough to go round when the present generation of students become qualified.

PUBLIC HEALTH IN PALESTINE.

WERE the English given to self-praise rather than to criticism they might dwell with no little satisfaction on the excellent results of those public health measures against infectious disease which depend mainly upon British organization and executive in the Near East. By the courtesy of the Director we have before us a copy of the first annual report (1921) of the Department of Health under the Government of Palestine. It is a very modest document, not in print, but in multigraph; the achievements recorded in it, however, are well worthy of notice. It gives a concise account of the building up from the beginning of a medical and of a health service in a country ravaged by war and decimated by disease. Under the Ottoman code a skeleton of a medical service existed in theory, which, had it been adopted in practice, might have sufficed for the primary needs of the country. In voluntary organizations, however, the country was comparatively rich, and the report fully recognizes the admirable work done by them in the early days of the new Government. The Syria and Palestine Relief Society, the American Zionist Medical Unit, and the American Red Cross, in their respective spheres, organized hospitals, clinics, and relief. In 1919 and 1920 the old-established charities such as the Church Missionary Society, the Scottish Mission, the Hospitals of the Order of St. John, the American Zionist Unit, and the French Religious Hospitals were reopened, and are now in full working order in spite of the ransacking of their equipment and in several instances the ruin of their buildings during the earlier years of the war. To a large extent they relieved the Government of its responsibility by providing accommodation for the country's sick in general, as distinct from Government employees and patients with infectious diseases. The Government hospitals number eleven and contain three hundred and seventy-two beds; the voluntary hospitals, which number twenty-three, provide nearly a thousand beds. There are five smaller voluntary special hospitals and thirty-one dispensaries. The proportion of hospital beds thus appears to be 1 to 536 of population, a very creditable figure. The general directorate or central organization of the Department of Health is divided into five sections. The first deals with public health and epidemics. It includes a sanitary engineering subsection which deals with antimalarial projects and co-ordinates the sanitary projects with public works. In a land where water supplies are unsatisfactory and insufficient, where town drainage is practically non-existent, and where antimalarial drainage of swamp areas is perhaps the first sanitary need, the importance of this section need not be emphasized. The second section of the directorate deals with medical and hospital organization, an important subsection dealing with ophthalmic hospitals, ophthalmic treatment of school children, and special surgery. The third section controls bacteriological, analytical, and entomological laboratories. There is a central bacteriological laboratory at Haifa and four Government clinical laboratories in Jerusalem and other towns. The fourth section directs the quarantine service, including relief, lunacy, and railway sanitation. The work of the quarantine service has become each year more exacting. The fifth section deals with medical stores. The local health administration is under principal medical officers of health, who are responsible for medical, health, and quarantine services within their district. Under them are district medical officers and hospital and quarantine medical officers, under whom again are sanitary, antimalarial, and quarantine subinspectors, disinfecting and nursing staff. Development has been hindered by the smallness of the credits available, but the nucleus of each essential service now exists and can be expanded as financial conditions allow. The administration has thought ahead and has adopted a programme which will in any case take several years to realize. The most important projects include the extension of the antimalarial campaign to include the reclamation of marshes, public water supplies in the larger towns and villages, main drainage in the more important towns where water supply is established, additional accommodation for the treatment of trachoma and for the development of scavenging services. Great importance is attached to the training of midwives, there being at present only 51 trained midwives in Palestine. Malaria has decimated the population for centuries, and whilst the measures taken in populous areas to destroy and prevent the breeding of mosquitos in the innumerable rock cisterns, the treatment of infected persons, and educational work dealing with the nature and prevention of the disease are of great value, they cannot attain full success while the marshes continue to be great anopheles reserves. Successful Government schemes have been carried through in the Beisan and Jenin marshes, and private enterprise has been encouraged wherever possible, as in the Wadi Gazaze, at Musherifa, and in the Kinnereth marshes. To give some idea of the amount of work done apart from the draining of swamps we may mention that during 1921 sixty-six thousand possible breeding places—wells, cisterns, and cesspits—were recorded and registered; sixteen thousand of these were made mosquito-proof by closure or covering, and eleven hundred by fitting pumps; oiling was carried out on nearly two-thirds of a million occasions in those places which could not be rendered mosquito-proof, seventy-six tons of paraffin and crude oil being used. Householders neglecting to carry out precautions after warning were prosecuted in 702 instances. Trachoma is the second great plague of Palestine; it is estimated that 74 per cent. of school children are infected. The amount of work and organization necessary to combat this disease and its sequelae is gigantic. Most creditable to the sanitary and quarantine administration is the lowness of the general incidence of infectious disease, especially considering the geographical situation of Palestine. No case of cholera, only 4 cases of plague, one small outbreak of smallpox with only one fatal case, 63 cases of typhus fever with six deaths, 368 cases of typhoid fever with a case mortality of 9 per cent., and 91 cases of paratyphoid with a case mortality of 3 per cent., make a remarkably low record. Rabies is very prevalent amongst the dogs and hyenas; and 465 patients received antirabic treatment in the Pasteur Institute of Jerusalem during the year. British preventive medicine may well be proud of her latest offspring.

THE TRAINING OF THE PHARMACIST.

ON October 4th the School of Pharmacy of the Pharmaceutical Society of Great Britain entered upon its eighty-first session. The ceremony took place in the Society's examination hall in Bloomsbury Square. In his opening speech the President (Mr. E. T. Neathercoat) remarked that pharmaceutical training was in a state of transition at the present

moment, and the Council was giving this matter their closest attention; and the Dean (Professor Greenish), in his report on the year's work, welcomed the prospect that in the very near future the time given to the student's training would be materially extended. The twofold function of modern pharmacy—research and education—has been emphasized by the award this year of the Hanbury medal to Professor Émile Perrot, who has made important investigations into the stabilization of vegetable drugs, and holds the office of Vice-Dean of the Faculty of Pharmacy in the University of Paris and professor of materia medica. The President, in presenting the medal and welcoming Professor Perrot, mentioned that he was the fourth distinguished Frenchman to receive this award. The inaugural sessional address was delivered by Mr. H. J. Waring, F.R.C.S., Vice-Chancellor of the University of London, and here again education was kept in the foreground. His subject was the advantages (and the drawbacks) of a university training for a technical vocation such as pharmacy. His method of approach was to sketch the main outlines of a university course in the basic subjects of a vocational curriculum. For the technical vocations of pharmaceutical chemistry and pharmacy he thought it would be an advantage if all students underwent a scientific training comparable with that which was now regarded as necessary for industrial chemistry, engineering, and medicine; and he urged the need for some instruction in the principles of biology, so that the pharmacist should understand thoroughly the practical part of his science. Another advantage of a university course was that it enabled the student or practitioner to carry out with intelligence original investigations in his own subject and so promote the advancement of his vocation. But Mr. Waring recognized that all students were not alike; some who could readily learn all the mechanical parts of their profession had not the intellect to grasp the theoretical parts, and it was far better that they should not attempt a university or college education.* He had long held the view that pharmacy was worthy of a higher position among the technical vocations, and for this reason he welcomed the news that the standard of the entrance examination for the School of Pharmacy was likely to be raised. A higher level of preliminary general education was needed if all the advantages of a scientific training were to be gained. It had been suggested that a closer connexion with the University of London by the Pharmaceutical Society would have a beneficial effect on pharmaceutical chemistry and pharmacy. In general principle this appeared correct, and if the Pharmaceutical Society brought forward a concrete scheme in which they asked that either pharmaceutical chemistry should be made the chief subject for a science degree or that a new degree, such as Bachelor of Pharmacy, should be instituted, the University would explore the whole question and try to meet the Society in every way, provided that whatever was done was for the progress of science, the good of the nation, and the improvement of the vocation.

PRINCESS MARY INFANTS' WARD AT LEEDS.

The General Infirmary at Leeds contains within its walls, as everyone who is conversant with its working knows, a fully equipped children's hospital. The tendency of the great Leeds charities has been towards centralization and not to the multiplication of small institutions. The management is fully alive to the desirability of segregating those of tender years and of securing facilities for the early removal to suitable extensions of the hospital in the country of patients who have been subjected to operations or have suffered from medical complaints as soon as this is deemed wise. The rearrangement of beds throughout the hospital, which was commented upon in this column some months ago, has secured this segregation by the allotment of three large wards (Nos. 6, 8, and 10) for children. Each has accommodation for thirty-three patients, and it is expected that this accommodation will be increased by the provision of a certain number of cots in an open-air ward on part of the north terrace. On the surgical side of the house the patients are dealt with by the ordinary surgical staff; on the medical side, some two years ago, special arrangements were made. It was arranged that one member of the staff, Dr. Vining, who at that time was junior assistant physician, should in his infirmary work confine his attention to the subject of the diseases of children. He had his out-patient clinics, and to him was allotted all the cots which were, or in future might be, devoted to the care of infants under the age of 3 years who were suffering from nutritional diseases. This class of patient was specially considered, as it was felt that a great work was awaiting development in connexion with infant welfare. Already Dr. Vining's work has borne fruit—directly by the increased attention that this class of patient receives, and indirectly by the improvement of the teaching of students. Dr. Vining's work is not confined to children of this age, for he has out-patient clinics for children up to 10 years of age, and to him are allotted a proportion of the cots for children up to that age. The institution of this special department for children is regarded as a step in the right direction and as one that will prove to be free from some of the disadvantages of special hospitals. It is in connexion with this development of the work of the Infirmary that the opening of the Princess Mary Ward for Infants has been so very cordially welcomed. At the suggestion of the Lord Mayor, the Princess was graciously pleased to allow the wedding present which Leeds desired to present to her to take the form of this ward to be added to the Infirmary. Large donations were not solicited, and it is especially pleasing to learn from the speech of the Lord Mayor, when he was requesting the Princess to declare the ward open, that some 40,000 of the school children of Leeds had added their mite to the £6,000 which had been contributed. The ceremony of opening the ward was performed by the Princess, who, along with Viscount Lascelles and the Countess of Harewood, visited the Infirmary on October 2nd; the weather was fine, and the reception accorded to Her Royal Highness was most cordial. Admission to the Infirmary was granted to as many as it was possible to accommodate along the course which was followed by the Princess, who, after some presentations had been made, was conducted to the new ward by Mr. T. L. Taylor. Here the Lord Mayor read an address, and asked the Princess to open the ward with the key which was presented to her by Mr. Sydney Kitson, the architect of the new ward. Having done so and declared the ward open, Princess Mary made a full inspection of the ward and of its annexes under the guidance of Mr. T. L. Taylor, who had, in a few well-chosen words, thanked the Princess for her gracious gift. Old students will be interested to know that the new ward occupies the space between the staircases of No. 6 and No. 8 wards, largely above the clinical lecture theatre. Access to it is from the north terrace and also in connexion with the landing of No. 8 ward. It is self-contained, and has lavatories and kitchen of its own. There is accommodation for some twelve or fourteen cots for infants. Dr. Vining will be in sole charge of this ward, and its provision will enable him to develop this part of his work on good lines.

THE QUEEN ALEXANDRA SANATORIUM FUND AT DAVOS.

We have had several inquiries in recent years about the fate of the Queen Alexandra Sanatorium in Davos. This institution was founded chiefly as a result of the labours of the late Lord Balfour of Burleigh, to secure the advantages of sanatorium treatment in an alpine climate for persons of small means of the English-speaking nationalities suffering from curable tuberculosis but unable to afford the ordinary expenses of such treatment. A daily average of 40.7 patients were in residence during 1914, and at the general meeting held in July of that year the eminently satisfactory eleventh annual report was presented. It was decided to complete the last few unfinished items of the building, and orders were given to that effect.

* Cf. Sir Clifford Allbutt, "The Training of the Medical Student," British Medical Journal, September 2nd, 1922 ("University v. Technical School," p. 468).

A few days later the blow fell; the male servants were called up for military service, and all except three of the female staff left in a panic. Most of the patients returned home as soon as travel was possible, and the remainder were transferred on the approach of winter to a hotel in Davos. In April, 1915, the work of the sanatorium ceased entirely. The building thus remained empty until 1922, an offer of its use for convalescent or sick soldiers being declined by the War Office. During these years the overhead charges continued to run, and when the time came for reopening there was no balance available for the large initial outlay, and an appeal for this purpose proved fruitless. Last summer the building was sold to the cantons of Thurgau and St. Gallen for a popular sanatorium and the proceeds were invested to serve the original object of the Fund. Legal advice at this stage made it clear that the income must continue to be applied towards the treatment of patients in an alpine climate—that is to say, in Switzerland and not in Great Britain. Sale of the building itself was not held to constitute failure of the original object. Of the possible alternatives the Council decided on a system of money grants conditional upon treatment being taken at some approved place. The gross income available for such grants is expected ultimately to reach £1,800 a year. The establishment approved for the purpose is, for the present, the Hôtel Frei, Davos Platz, where the charge made to nominees of the Fund for board and lodging will be fr. 12.50 a day. This charge includes a separate room, central heating, and electric light. Rooms will be assigned by the local committee. The visitor's tax of 55 centimes a day will bring the hotel charges up to fr. 13.05 a day, or fr. 91.35 —equivalent to about £4—a week. Assistance from the Fund will be given in the following form: (*a*) a grant of fr. 38 a week towards the hotel bill (paid direct to the hôtelier), (*b*) free medical attendance by a visiting physician, (*c*) free nursing by a resident nurse, (*d*) payment for medicines and bacteriological examinations ordered by the physician. The net cost of maintenance and treatment to an assisted patient (excluding personal laundry) is estimated not to exceed £2 10s. a week. Assistance is limited to the winter months and to a period of six months in all. The cost of the journey is borne by the patient; a second-class single ticket from London to Davos Platz costs about £5 15s. Those aided by the Fund will be expected to stay throughout the winter season. The medical report on which assistance is granted is filled in by the applicant's usual medical attendant, for submission to one of the examining physicians to the Fund. Dr. Arnold F. Bill and Dr. Florian Buol are the visiting physicians in Davos. Application forms and further information will be sent by the Secretary, Queen Alexandra Sanatorium Fund, Davos Platz, Switzerland. Copies of the forms only can also be had from the Honorary Secretary to the Council, Mr. D. Vesey, 3, Camp View, Wimbledon Common, London, S.W.19.

NAVAL MEDICAL SERVICE MEMORIAL.

A short time ago (August 26th, 1922, p. 396) we published an account of the unveiling of a memorial tablet at Haslar Hospital to the members of the naval, medical, and nursing services who fell in the great war. A similar memorial tablet, dedicated to the memory of the medical officers, sisters, V.A.D.'s, sick-berth staff, and sick-bay reserves of the Royal Navy who fell in the great war, has now been erected at the Royal Naval Hospital, Plymouth. It was unveiled on October 4th by Surgeon Rear-Admiral Sir Daniel McNabb, principal officer of the hospital. In his dedicatory speech he dwelt especially upon the spirit of comradeship that ran through all ranks of the navy, knitting them together in a bond of devotion to duty and to their country. The medical staff, he said, in action lacked the excitement of the fighting man; their duty was especially to keep themselves as cool and unconcerned as though at a surgical demonstration, and to exercise the same delicate skill that they would display in the operating theatre of a hospital at home. The type of man who could do this was of no ordinary kind, and it reflected the highest credit on the medical service of the navy that its duties under such trying circumstances should have been so brilliantly and efficiently discharged. Among those present at the ceremony were Surgeon Vice-Admiral Sir Arthur May, Surgeon Rear-Admiral Sir William Pryn, representatives of all ships and establishments, and of the British Red Cross Society and the St. John Ambulance Association.

EXHIBITS AT THE ROYAL COLLEGE OF SURGEONS.

The excellent practice of displaying specimens recently added to the museum of the Royal College of Surgeons of England in one of the rooms is being continued this year. The specimens are now on view in Room 1, and will so remain until November 10th. Some eighteen months ago a number of subscribers presented to the College the collection of anatomical specimens of the anatomy and lesions of the nose formed by the late Professor Onodi. Nearly one hundred of these have already been redissected and remounted and are included in the collection now shown. Amongst the other exhibits at Lincoln's Inn Fields are a series of specimens demonstrating the circulation in the shark which have been made by Mr. R. H. Burne, the physiological curator to the museum, as well as a number of pathological specimens of interest, presented by different surgeons and physicians.

THE MEDICAL SOCIETY OF LONDON.

The one hundred and fiftieth session of the Medical Society of London opens on Monday evening next, October 16th. The annual general meeting will be held at 8 o'clock, and the President (Mr. James Berry) will vacate the chair in favour of his successor, Lord Dawson of Penn, G.C.V.O. The presidential address will then be given by Lord Dawson on "Certain developments in medicine," to be followed by a discussion. An interesting programme has been drawn up for the first half of the ensuing session. On October 30th a clinical meeting will be held for the exhibition of cases and radiograms illustrating tumours of the abdomen (other than those of the female appendages). On November 13th there will be a debate on "pernicious anaemia," and on November 27th a discussion on blood transfusion in civil practice. On December 11th Sir William Willcox will introduce a discussion of the clinical, pathological, and radiological aspects of infections of the teeth and gums. These meetings will be held at 8.30 p.m. at 11, Chandos Street, Cavendish Square. The Lettsomian lectures will be given in February and March, 1923, by Mr. W. Ernest Miles on carcinoma of the rectum, and Dr. J. Walter Carr will deliver the annual oration in May.

THE PRINCE OF MONACO'S BEQUESTS.

The late Prince of Monaco bequeathed the sum of 1,000,000 francs to the Académie de Médecine, the income to be used for a prize every second year. He bequeathed the same sum for a similar purpose to the Académie des Sciences, the nature of the subject to be selected in each case by the Academy in relation to the needs of the moment. He bequeathed to the Institute of Human Palaeontology, founded by him in Paris, all his books, drawings, and specimens relating to the subject, and directed that a scheme should be drawn up for research work and investigation to establish scientifically the history of man and his origins. He also left 700,000 francs to Dr. Jules Richard for the completion of scientific and literary work in connexion with the great Oceanographic Institute at Monaco, which has a branch in Paris, and other moneys, together with his books and collections, to the same Institute. To the French Academy of Agriculture he left his farm at Ste-Suzanne, to be maintained as a place for agricultural experiments, and as evidence of what science and determination can obtain from unpromising soil.

The first social evening of the new session of the Royal Society of Medicine will be held on Wednesday, November 8th. The new President, Sir William Hale-White, and

Lady Hale-White will receive the guests at 8.30 p.m., and at 9 p.m. Sir John Bland-Sutton will give an address entitled "Spolia Memoralia; Shrunk Human Heads, Labrets, and Ear-plugs." Music and light refreshments will be provided.

THE BACTERIOLOGY OF TINNED MEAT AND FISH.

THE Food Investigation Board of the Department of Scientific and Industrial Research has issued this week a timely report by Dr. W. G. Savage, Mr. R. F. Hunwicke, and Mr. R. B. Calder, on the bacteriology of canned meat and fish.[1] It consists of five parts. The introductory section deals with methods of examination and record, cultural tests and bacterial classification, and gives a summary of the foods examined; Section II describes the organisms isolated and discusses their significance; Section III records a special investigation into the relationship between oxygen requirements and decomposition changes in tinned foods; Section IV discusses generally the results obtained from these researches; and the concluding section reviews briefly the work of other investigators. The pamphlet ends with a useful list of references to the literature of the subject.

Aim and Method of the Inquiry.

In approaching this investigation the following considerations and lines of inquiry appeared to the authors to be of primary though not of equal value:

"(*a*) To study how far canned foods contain living bacteria or their toxic products, which are capable, under favourable conditions, of setting up food poisoning or food infections. This applies not only to canned foods which are rejected by the tests employed by inspectors, but also to food passed and consumed as being sound.

"(*b*) To ascertain to what extent canned foods passed for consumption are free from bacteria, and, if not sterile, the importance and significance of the bacteria found.

"(*c*) To study the bacteria associated with and concerned in the spoilage of canned foods with a view to diminishing wastage from such causes."

The total amount of canned foodstuffs lost through spoilage is enormous, though it is now relatively small in proportion to the quantity canned. To diminish this wastage to the lowest possible figure can only be achieved if the bacteria which cause spoilage are known, their modes of introduction ascertained, the conditions necessary for their growth elucidated, and the efficiency of the sterilization processes studied in the light of the actual bacteria found both before and after sterilization. While an exact study of the bacteria present is essential, other considerations come in, and the authors made it their aim to investigate the subject as a whole in all its bearings. This led them to make a number of subsidiary researches—for example, into the chemical properties of the organisms isolated under the conditions occurring in canned foods, and into the relative suitability of the different foods as culture media.

The present report is confined to meat and fish, which present very similar problems; fruit, vegetables, and milk will be dealt with in later reports. For the purpose of this investigation 344 samples of tinned meat and tinned fish (including crustacea) of different kinds and from various sources were examined. Some were ordinary samples passed by the inspectors or purchased in shops, but most of them had been rejected for one reason or another. Nearly all the meat tins contained corned beef, and no samples of made-up meat products were included. Each sample was very thoroughly examined, and the findings were compared with the physical characteristics of the unopened tin, with the characters of the contents after opening, with direct microscopic examination of the food, and with the chemical findings. Besides this many sound tins were experimentally inoculated with pure cultures of the bacilli isolated. Full details are given of the methods of examination and recording adopted, and the precautions taken to avoid outside contamination. In every case the cultural characters of the organisms were studied in pure culture. Certain characters were recorded as of special importance—namely, powers of resistance, conditions as regards oxygen requirements, optimum temperature for growth, and ability to decompose proteins. Here it may be noted that the indol test was found of no value in distinguishing between types of bacteria which can decompose tinned foods and those which cannot.

The Organisms Isolated.

The micro-organisms isolated were classified into six groups: (1) moulds and yeasts; (2) obligate anaerobic bacilli; (3) sporing aerobic bacilli (excluding thermophils); (4) thermophilic bacteria; (5) non-sporing aerobic bacilli; (6) micrococci.

(1) Yeasts, though plentiful in tinned milk and fruit, are scarcely ever found in tinned fish or meat. The presence of moulds is evidence of air access; there is nothing to show that it can cause either "blowing" of tins or extensive decomposition of the meat, but it makes the food unsaleable.

(2) Anaerobic bacilli were looked for in every sample, for the important part these were likely to play was recognized. They were found in 27 samples—9 meat tins and 18 fish tins. Seven strains corresponded with *B. sporogenes* and 12 with *B. rauschbrand* type. The former type of organism was found capable in pure culture of producing putrefactive decomposition in canned meat with obtrusive "blowing" of the tin; the latter caused gas development and, if given time, it led to pronounced decomposition. It appears that obligate anaerobes, if they get a chance to grow, always produce profound changes in the food.

(3) Assuming that sound canned foods are not of necessity sterile, it is important to distinguish between the types of organism which may be looked upon as actual or potential causes of decomposition and those which are harmless concomitant bacilli. From this point of view the ordinary sporing aerobic bacilli are of much consequence because of their wide distribution in canned foods, their great resistance to heat, and the ability of most of them to break down proteins. Special attention was therefore paid to this group as a cause of unsoundness in tinned food. Since there is at present no satisfactory classification, the authors made no attempt to give names to most of the strains, but classed them into alphabetical subgroups. In regard to the significance of this group, the two main questions were whether its members possessed any pathological or harmful significance, and whether they could decompose meat or fish either under ordinary conditions or in specially favourable circumstances. Most of them were found to be widespread saprophytic bacteria devoid of any pathogenic properties. Studying the relation between decomposition and sporing aerobic bacilli, the authors found that their presence, as such, even if proteolytic, cannot be accepted as evidence of unsoundness. Nevertheless, it is conceivable that in special circumstances they may have been the cause of the unsound condition of the tins with which they were associated. For instance, the presence of small leaks, by permitting access of air, might possibly supply the oxygen necessary for their growth and enable them to multiply and decompose the food.

The factor of access of air assumed greater importance as the inquiry went on; but from time to time the authors came across strains of aerobes which grew well under anaerobic conditions, and careful investigations were made.

"It is evident from these experiments that sporing aerobes are very widely present in canned meat and marine products even when the tins are sound and the contents perfectly good. Although most of them are capable of readily decomposing proteins under favourable conditions of growth and temperature, they do not do so in hermetically sealed tins, because the supply of oxygen is inadequate. Some of them—possibly a majority—possess the ability to multiply under strict anaerobic conditions, but at the best growth is slight and far less than would occur if oxygen were available. Grown under these conditions they do not cause decomposition, either because of the inadequate growth, or because a supply of oxygen is necessary for the manufacture of proteolytic enzymes. Such a conception at once emphasizes the importance of leaks in the tins. Given a hole in the tin which will admit sufficient air, our experimental results show unmistakably that these strains will not remain dormant but will multiply, produce proteolytic enzymes, and decompose the contents. In most of our experiments the air access holes were about 4 mm. in diameter, but . . . the same result may be obtained with pin-hole leaks."

(4) Thermophilic bacteria are widely distributed in canned foods, even when the contents are perfectly good in every way. Their wide distribution in sound products and their negative properties (inability to produce gas or decompose proteins) indicate that they are not a cause of spoilage of this kind of canned food, either in natural conditions or as a potential cause when small leaks allow the entry of enough air to enable them to multiply.

[1] *The Bacteriology of Canned Meat and Fish.* By William G. Savage, M.D., B.Sc., R. F. Hunwicke, B.Sc., A.I.C., and R. B. Calder, B.Sc. Special Report No. 11. London: H.M. Stationery Office. 1922. (Pp. 72. 2s. 8d. post free.)

(5) For the purpose of this inquiry the important features of the non-sporing aerobic bacilli are the possession of proteolytic properties and the ability to ferment carbohydrates with the production of gas. In all 78 organisms were isolated and classified amongst the divisions of this group. Those which both liquefy blood serum and ferment carbohydrates with gas production are an important cause of decomposition in canned meat or fish. Those which ferment carbohydrates with gas formation may "blow" the tins but do not lead to much decomposition. Those which are neither proteolytic nor fermentative have no significance as causes of unsoundness.

(6) Micrococci of different kinds were present in some 23 per cent. of the samples. Most of them were morphologically diplococci; but staphylococci, streptococci, and here and there a sarcina, were also isolated. The authors are confident that micrococci play no part in causing unsoundness, and the reasons for this opinion are stated at length. These strains cannot by themselves in the ordinary way cause decomposition in canned meat or fish; nor were any facts observed suggesting that they may act symbiotically and so assist more active strains. In the absence of any leak they can sometimes survive the sterilization processes.

Throughout this investigation no bacteria of the food-poisoning types were detected, and there was nothing to suggest that the organisms associated with the unsound conditions present were pathogenic to man.

Soundness and Sterility.

A full account is given of a special inquiry into the relation between oxygen requirements and decomposition, leading to the opinion that minute leaks act not so much as sources of infection, but as sources of oxygen which light up and set into activity the dormant germs which are there already.

In their general discussion of the results the authors deal first with the comparative insterility of sound samples. Of 76 shop samples, whose contents were perfectly sound, 47 were not sterile, but this was almost wholly due to sporing aerobic bacilli, thermophilic bacilli, and micrococci. These, it seems, are to be looked upon as the survivors of bacteria originally present; they are not invaders through leaks in the tins. Such surviving bacilli do not in any way injure the foods they inhabit because they cannot multiply and decompose under the existing conditions.

"The importance of our findings is not that they indicate any danger to health but that (*a*) they show that sterility is not in itself a reliable test of soundness and that samples cannot be justifiably condemned merely because they are not sterile; (*b*) they emphasize the fact that unsoundness in tins is not solely or even usually due to outside contamination but that tins may become decomposed and unmarketable not because outside bacteria gain access but because the conditions within the tin have become changed (for example, by access of sterile air) in such a way as to enable bacteria already present to multiply and decompose the food."

The chief practical conclusion to be drawn from this report is that the conditions under which tinned meat and fish go bad are far more complex than is generally supposed.

"The prevailing view is that canned food tins become unsound according as to whether they do or do not contain bacilli of the decomposing type. Indeed, the ordinary view is still simpler. It is supposed that if the processes of preparation are satisfactory the food contained in the tins is sterile and remains sound, but that if the sterilization is inadequate or leaks subsequently develop bacteria are left alive or gain access, and the food becomes unsound. The type of bacterium present is hardly considered. These simple conceptions cannot be maintained. We have to regard canned meat and fish products as at the best only partly sterilized, and for the most part as containing viable bacilli, many of which are of a decomposing type. The food is sound rather on account of its being free of oxygen than because it is sterile."

Whether the food becomes unsound depends upon many factors, of which the following all play a part: (*a*) the extent and type of the bacterial contamination; (*b*) the efficiency of the "processing" (sterilization by heat); (*c*) the access of air to the tins; and (*d*) the temperature environment of the samples.

The Moral for the Manufacturer.

The moral therefore is that the manufacturer who wishes to ensure the absence, or at least a minimum, of spoilage in tinned meat and fish must be encouraged to do five things: he should obtain his food products as fresh as practicable; he should tin them as speedily as possible under conditions of great cleanliness; he should treat his products so as to ensure the presence of a vacuum; he should employ the right "processing" temperatures; and lastly, by the use of good quality tinplate and efficient tin-closing methods he should avoid causes of leakage, and so maintain the vacuum.

England and Wales.

JUBILEE OF MANCHESTER SCHOOL OF MEDICINE.

THE jubilee of the Manchester School of Medicine was celebrated on October 4th, when the Dean of the Medical Faculty, Professor R. B. Wild, received a large number of guests, who were shown over the medical school and the recent extensions of its laboratories. Sir Humphry Rolleston, President of the Royal College of Physicians of London, delivered a lecture on the subject of "Recent physiology of the liver in its application to practice." Sir William Milligan, who presided, paid an eloquent tribute to the work which Sir Humphry Rolleston had contributed to the science and art of medicine. Professor G. R. Murray, who also spoke, said that it was not generally remembered that Sir Humphry Rolleston, while at Cambridge, had represented the university on the football field.

The medical school at Manchester was founded by Thomas Turner in 1824, in connexion with the Manchester Royal Infirmary. Previous to this London had enjoyed a monopoly of medical education in England, and Turner's medical school in Manchester was the first to be recognized outside London. William IV conferred the prefix of "Royal" upon it. The Manchester Royal School of Medicine was amalgamated with Owens College in 1872, and Turner died in the following year, having been able to deliver the opening address of the amalgamated college nearly fifty years after his foundation of the medical school. In 1880 Owens College became the first college of the new Victoria University for the north of England, and three years later the new university became empowered to confer its own medical degrees. Enlargements in 1883 and 1894 brought the medical school to its present size, and a further great advance was made when the Royal Infirmary was rebuilt on its present site in 1908. A rearrangement of the interior of the medical school last year has almost doubled the laboratory accommodation for teaching and research.

UNIVERSITY COLLEGE HOSPITAL DINNER.

The First Administrations of Ether.

The annual dinner of past and present students of University College Hospital was held at the Hotel Cecil on October 6th, with Sir Dawson Williams in the chair. The company numbered 110, and included Sir Rickman Godlee, Sir John Rose Bradford, Sir Frederick Mott, Mr. Raymond Johnson, Sir J. H. Parsons, and Major-General Sir A. P. Blenkinsop.

After the King's health had been honoured, the Chairman proposed prosperity to University College Hospital and Medical School, and recalled that it was the first hospital in this country to be built as a teaching hospital. Speaking of the history of the buildings in Gower Street, he said that the spirit of the old dingy hospital of former days overmastered the inferior accommodation, and admirable work was done then under most unfavourable conditions. The chairman had before him on the dinner table a chairman's bell presented to University College Hospital by Dr. F. W. Cock. It is one of two bells both cast from the same ingot as the two new bells recently hung in Westminster Abbey. Each was suspended from an iron support made from the railings of the old operating theatre in University College Hospital. The other bell Dr. Cock presented to the Massachusetts General Hospital. Both bells were engraved with the names of the "General Hospital, Massachusetts," and "University College Hospital," with the dates, and both bore also the monkish Latin rhyme of the eighteenth century often found on church bells, "Nolae pulsatio amoris ratio," which may be freely translated, "When I do sound let joy abound." The chief bell foundry in early times, it should be explained, was at Nola in Campagna, so that the name of the place became synonymous with bell. The gifts were intended to commemorate the fact that ether was first administered as a general anaesthetic in the Massachusetts General Hospital on October 16th, 1846, and was first so administered in Europe at University College Hospital on December 21st of the same year. The operation at Boston was for a vascular tumour of the neck and was performed by Dr. Warren. The operation at University College Hospital was for amputation above the knee and was performed by Mr. Liston. The chairman read a letter which Dr. Cock had received from the board of trustees of the Massachusetts General Hospital expressing their high appreciation of all the bell presented to them represents and means. "They value it," the letter continued, "most highly not only for these reasons but also as a generous expression of that friendly

feeling which exists and should always exist between the two countries. When this bell is rung here and when its mate is rung at the Annual Students' Dinner of University College, may the sound remind all the hearers of the ties of blood and friendship which we trust will grow ever stronger with the passing years." On the suggestion of the chairman on October 6th it was resolved to send a message of greeting by those present to their colleagues of the Massachusetts hospital. The toast was responded to by Dr. George Blacker, Dean of the Medical School, who said that the entry of new students this year was very good and included a considerable proportion of Oxford and Cambridge men. Progress was being made in the erection of the new buildings rendered possible by the Rockefeller benefaction, and in association with this gift a lectureship in biochemistry had been instituted, with Mr. C. R. Harington as the first lecturer. In reviewing the events of the past year, Dr. Blacker noted the knighthood conferred on three old students—Sir George Abram, Sir J. Herbert Parsons, and Sir A. P. Blenkinsop; the election of Dr. Charles Bolton to the Julius Mickle Fellowship in the University of London; and the award of the British Medical Association's Gold Medal of Merit to Colonel Arthur Martin-Leake, V.C. with Bar.

Dr. Herbert Spencer proposed the health of "Our Chairman, our Alumnus, the Editor of our Journal." He said that Sir Dawson Williams studied at University College under three great teachers—Sharpey, Bastian, and Jenner—and had proved in his own person (as one of them had said) that honesty, kindness, and decision were the three great attributes of success in the medical profession. While doing hospital work as a physician he carried out some remarkable researches; then for twenty-five years he had devoted his learning, wisdom, and tact to making the BRITISH MEDICAL JOURNAL the greatest medical journal in the English language. Under his direction it had improved in every way; but, alas, its price also had gone up! Dr. Spencer spoke of the delight felt by all the chairman's friends at the knighthood bestowed on him in recognition of his great contributions to medical science, and at the honorary degrees in science, letters, and law he had received from three British universities. The duties of the Editor of the BRITISH MEDICAL JOURNAL were multifarious, arduous, and exacting, but from his room high up in the building at the corner of Agar Street with its wonderful prospect over London, the Editor took a wide view of medicine and of life.

POST-GRADUATE COURSE AT SHEFFIELD.

The new series of post-graduate lectures and demonstrations for 1922 arranged by the Faculty of Medicine of the University of Sheffield began last week. The lectures and demonstrations are given on Tuesday and Friday afternoons at the Royal Infirmary, the Royal Hospital, the Jessop Hospital, and the University. The course ends on December 15th. On Tuesday, October 17th, at 3 p.m., Professor Mellanby will lecture at the University on shock, and on Friday, October 20th, at the Royal Infirmary, Dr. Barnes will give, at 3 p.m., a demonstration of stomach cases, and at 4 p.m. Mr. Finch will speak on the surgical treatment of indigestion.

A MEDICAL SHERIFF OF LINCOLN.

The Lincoln City Council has unanimously decided that Dr. Godfrey Lowe should be appointed sheriff of Lincoln for the ensuing municipal year. The sheriff-elect is a native of the city, and a son of the late Dr. G. M. Lowe. He was educated at St. Bartholomew's Hospital, and qualified in 1894. He did valuable public work as a city councillor from 1911 to 1916, and he has had a long connexion with the Imperial Forces. He joined the 1st Volunteer Battalion the Lincolnshire Regiment as a private in 1888, and was granted a commission in 1900; he retired with the rank of captain in 1910. In 1912 he joined the R.A.M.C.(T.F.) on the staff of the 4th Northern General Hospital. Mobilized on the outbreak of war, he served with his hospital until August, 1919, for the last six months as registrar with the rank of major. Dr. Godfrey Lowe has long been a prominent member of the British Medical Association. In addition to the work he carried out during the war at the War Hospital, in his own practice, and helping other men, he acted as secretary of the Lincoln Local Medical War Committee. He was also secretary of the Lincoln Division of the British Medical Association from 1915 to 1921, and he has been secretary of the Lincoln City Panel Committee since 1916.

Scotland.

THE LISTER WARD.

IN the course of a private visit to Glasgow which Field-Marshal Earl Haig made on October 4th the Glasgow Royal Infirmary was visited. Lord Haig was shown over the Lister Ward by Professor Robert Kennedy, and expressed his keen pleasure at having the opportunity of seeing this historic memorial of the great surgeon. He expressed the hope that the ward would not be removed, but retained as a museum for the housing of the Lister relics and other exhibits associated with the evolution of surgery.

THE AFFLECK BEQUESTS.

The late Sir James Affleck, M.D., of Edinburgh, who died on September 24th, in addition to a number of private bequests left to the Royal Infirmary, Edinburgh, £5,000 free of legacy duty, desiring, if the managers approved, that a bed should be named "The Affleck Bed" in one of the wards where he served. In addition he left £1,000 for the purchase of radium for the use of the Infirmary, and £2,000 for the benefit of the nursing department. He left to the Longmore Hospital for Incurables £5,000, and to the University of Edinburgh £1,000, half for the University library, and half for a prize or medal to be awarded annually to the best student in the class of medical jurisprudence, to be named "The Maclagan Prize"; £500 was left to the Royal Hospital for Sick Children, and to each of three different funds of the United Free Church; four Edinburgh charities were left £100 each.

GLASGOW MEDICAL LUNCH CLUB.

At the meeting of the Glasgow Medical Lunch Club, held on October 5th, with Dr. F. W. Martin in the chair, Mr. Henry Baynton, the well-known Shakespearean actor, was present as a guest, and after lunch shortly addressed the members. In the course of his remarks Mr. Baynton expressed the thanks of his profession to the medical profession for the many kindnesses shown to them by doctors in many towns throughout the country. The chairman intimated that the time had now come to put the club on a more permanent basis, and to this end he proposed that office-bearers and a representative committee be appointed. The following officers were elected: President, Dr. W. L. Reid; Vice-President, Dr. John Henderson; Secretary and Treasurer, Dr. David McKail. To act with these in the management of the club a committee of nine members was chosen, representative of the various districts of the city.

Ireland.

BELFAST APPOINTMENTS.

AT the last meeting, on October 5th, of the Board of Management of the Royal Victoria Hospital, Belfast, Dr. J. A. Smyth, resident pathologist, was appointed to the new post of resident biochemist to the hospital, and Dr. J. T. Lewis, who has been in succession house-physician and house-surgeon to the hospital, was appointed resident pathologist. The medical staff had before the war urged the necessity of a biochemist or metabolist to the hospital, and the Board of Management had approved of the scheme, but its realization had to be postponed. The biochemist will be resident, and will devote all his time to the work; he will work under Dr. T. Houston, physician in charge of the department of haematology and vaccine therapy, but will have separate rooms in his laboratories. The professor of physiology and the lecturer on biochemistry at the university have promised their aid in this new departure.

TUBERCULOSIS IN BELFAST.

Dr. A. Trimble, the chief tuberculosis officer of Belfast, has just issued the annual report of his department, which has now assumed large proportions and embraces the Tuberculosis Institute, the municipal sanatorium at Whiteabbey, and the municipal Hospital for Tuberculous Children at Graymount. It is gratifying to note that the number of examinations has fallen from 3,420 in the year ending March, 1918, to 1,705 in 1921, and the number of tuberculous cases from 2,604 to 1,014.

A large number of non-tuberculous cases have also been examined, consisting chiefly of suspects. The decrease has occurred in both the pulmonary and non-pulmonary forms of tuberculosis. The total number of patients treated during the year was 6,571, and the total deaths from all forms of tuberculosis in the city was 855, giving a ratio of 1 to 7.6 of those coming under the scheme. As regards the influence of occupation, there are the usual large numbers of servants, doffers, spinners, stitchers, and also many labourers and housewives. Of the patients 418, or 41 per cent., were found to be living with other tuberculous patients, but the number sleeping in the same room has steadily decreased each succeeding year. Dr. Trimble again emphasizes the necessity for increased cleanliness to limit infection. The usual distribution of the disease is observed: the crowded, poorer districts are most heavily affected; the residential, "garden-city" districts are least affected. The tuberculosis nurses paid 49,270 visits, and Dr. Trimble insists on the great value of their work, both for prevention and treatment. In an interesting and important section dealing with pregnancy and tuberculosis is a table giving a brief analysis of the result of pregnancy in 1,120 tuberculous women: 8.3 per cent. miscarried; 89 per cent. were delivered of a living child at full term; 2.7 per cent. were delivered of deadborn children at full term; among the 8.3 per cent. other causes may have been at work. Dr. Trimble arrives at the conclusion that tuberculosis is not a very active cause of premature birth. In another table he gives the result of pregnancy on the clinical course of tuberculosis in 992 cases: 28.6 per cent. were improved; 49.7 remained unchanged; 16.2 were worse; and 5.5 per cent. died within one year of delivery. These figures are new and important, and show that the question of prognosis must be reconsidered. The *x*-ray, dental, and bacteriological departments all show increasing figures, as is to be expected with their ever-growing importance. An interesting account is given of the open-air school and of the municipal hospital for the osseous forms of tuberculosis. The school started in March, 1921, with 20 pupils; on March 31st, 1922, the attendance roll was 105. A large open garage at Graymount has been converted into an open-air day school; it can be protected from wind and rain coming from any direction; on the original concrete floor there has been laid down a circulating hot-water system, over which is laid a sectional wooden floor, so that even on the coldest and wettest days the children's feet are kept warm; Dr. Trimble testifies to the great physical improvement of the children at the school. In the hospital there are only 47 beds, but over 200 are required, and a seaside convalescent branch is also very necessary. The last pages of the report are devoted to charts and sections showing the steady fall in incidence and in mortality of tuberculosis in the last forty years.

Correspondence.

SERUM BY THE MOUTH.

SIR,—In the JOURNAL of July 1st (p. 29) Dr. Allison gives his experience of the use of serums and vaccines by the mouth. He began to use serums orally in 1892. In *New Serum Therapy* (Baillière, Tindall, and Cox, 1906) I mentioned several who had reported the use of antidiphtherial serum orally for diphtheria and hypodermically for sepsis as well. Dr. Allison evidently was early amongst all such explorers, and it was from where they were and where Dr. Allison admits he still is that my work began.

In *New Serum Therapy* the action of serums by the mouth was defined as being neither antitoxic nor antibacterial so far as its specific action on the organism was concerned. The other elements in the serum were described as elements controlling tissue tone and probably of glandular origin. A sharp line of division was made between normal serums and those which were the product of acquired immunity. In *Hormone Therapy by Sera, Vaccines, and Drugs* these other elements were recognized as hormones, and that they were the basis not only of tissue metabolism but also of tissue immunity. Their action was not obtainable by hypodermic injection of the serum any more than the specific effects of the antitoxic and antibacterial elements were obtainable by oral exhibition. It was also stated that to obtain the full immunity possessed by the animal supplying the serum it had to be given both orally and hypodermically—orally for the hormone action on the tissues, and hypodermically for its specific action on the toxin or organism.

In both publications the hormone action on the tissues was recognized as non-specific and extended to any antigen to which the tissues were toxophil. Dr. Allison's experiment with cooked thyroids is extremely interesting, and confirms my contention that the active principles of the endocrine glands are not affected by being administered orally in their natural medium any more than when they are the crude product of the laboratory.

May I correct the slip pointed out by the reviewer?—"Antidiphtheria serum *from a culture* grown on *a solution* of normal serum." In such a subject it is difficult to confine oneself to a reasonable space, but in the work published theory and practice are fully detailed.—I am, etc.,

Melbourne, Aug. 23rd. D. MONTGOMERIE PATON.

CHAULMOOGRA OIL IN TUBERCULOSIS.

SIR,—Major Carruthers will find the information he asks for in his letter in your issue of October 7th (p. 666) in the following papers by me on trials made during the last three years in tuberculosis of the soluble preparations of chaulmoogra and other oils, which I have used successfully in leprosy: (1) Sodium morrhuate in the treatment of tuberculosis, BRITISH MEDICAL JOURNAL, February 8th, 1919; (2) The successful treatment of leprosy by injections of soluble preparations of the fatty acids of chaulmoogra and other oils, and its bearing on the tuberculosis problem, *Practitioner*, August, 1921, p. 77; and (3) The application to tuberculosis of the successful treatment of leprosy by soluble preparations of chaulmoogra, cod-liver, and other oils, *British Journal of Tuberculosis*, 1922.

I shall be glad to give any further information desired by those willing to test the treatment under the carefully controlled conditions which are essential to our present state of knowledge, as it is possible to do harm in pulmonary tuberculosis, at any rate, with these powerful preparations, although trials now being carried out in several institutions in careful hands are not without some signs of promise.—I am, etc.,

LEONARD ROGERS.

London School of Tropical Medicine, Oct. 9th.

CARDIOLOGY.

SIR,—I shall esteem it a great favour if you will allow me to comment upon your review of my book in the JOURNAL of September 30th (p. 601), for I am extremely anxious there should be no misunderstanding as to the views I have put forward upon the important point raised by your reviewer. These are his words:

> "His detailed and reasoned criticism of the interpretations of records from the jugular vein is vitiated by the fact that he does not recognize that these tracings are records not of *pressure* but of *volume*."

I am somewhat at a loss to know what precisely is meant by this statement, that the jugular tracings are *volume* records, but as we are dealing with dynamics (fluids in motion) I presume that he means changes in the volume of the blood in the jugular vein obtaining during the cardiac cycle. If I am right I would ask in turn, What is it that determines these changes in volume, if not changes in pressure?

The determining cause of the systemic circulation as a whole is the pressure developed within the left ventricle during its systole. This pressure is transformed into the head of pressure within the aortic sac, upon which depends the circulation through the arteries, capillaries, and veins. During this course the pressure is continuously falling in exact proportion to the resistances overcome by the moving blood. As we near the terminal venous trunks the force of the ventricular systole is nearly spent, and accordingly we find very low pressure readings in the veins at the root of the neck, even to *minus* quantities. At this point the evenness of flow previously maintained in the veins is broken. It now shows haltings and accelerations, attended by congestions and depletions, the vessel wall rising and falling as the one or other condition occurs. The filling up of the vein is by afflux from behind, and it points to an impediment in front; the subsidence of the vein indicates withdrawal of the impediment.

What is it that holds up the venous inflow and then releases it? What but changes of pressure within the auriculo-ventricular chambers?—for the *vis a tergo* driving the venous blood will only yield to a *vis a fronte* on the heart side.

At times the filling of the jugular vein is not merely due to afflux *from behind;* there may be actual reflux from the heart into the veins at two points in the cardiac cycle —namely, (1) the auricular systole, (2) the ventricular systole (especially when the tricuspid valve is incompetent). Intravenous pressure will, of course, rise and fall with each venous distension and subsidence.

There remains yet another cause productive of movements in the internal jugular vein, this time independently of any alteration of volume of blood in the vein. Such is the impact upon the vein of any force from without, and this is illustrated by the carotid artery where it abuts upon the vein, the artery transmitting to the vein its share of the percussion wave projected by the left ventricle at each systole.—I am, etc.,

London, W., Oct. 6th. HARRINGTON SAINSBURY.

PSYCHO-ANALYSIS.

SIR,—If I mistake not, the correspondence upon this subject which has been proceeding in your columns arose primarily in connexion with the attitude which should be assumed towards it by the family doctor. The latter will find a very useful guide in the admirable, scholarly, and scientific address delivered last week (see October 7th, p. 655) by one of our most respected, cultured, and revered physicians—Sir Clifford Allbutt. Some time ago you were good enough to print a letter from me calling attention to the psycho-analysts' views as to dreams. It elicited one or two rather unimportant comments which did not seem to give further information in the desired direction. It was, for instance, suggested that "desultory reading" was not sufficient to warrant comprehension or criticism. Without being intentionally egotistical, I may mention that since retiring from practice I have had more leisure to peruse such works as interest me on the various branches of medicine than falls to the lot of the average general practitioner. Without being accused of conceit, I may, perhaps, be permitted to lay claim to average intelligence. It would thus be fair to assume that what is unintelligible to me will also be unintelligible to him. If this be so, it is only reasonable that he should be suspicious of a method which cannot be demonstrated and which does not seem to rest upon a basis of biology.

Psycho-analysts seem to rely largely upon unproved metaphysical assumptions, and it may be that for this reason their propositions have been too readily accepted at their own valuation. Thus it is possible that the more credulous medical men tend to assume that reasoning which rests upon a branch of knowledge with which they are not conversant is sound, while on the other hand scientific psychologists may be misled by believing that the views of psycho-analysts have the support of physiologists and neurologists. Perhaps some of these may be induced to state their opinions now that Sir Clifford Allbutt has brought the subject before us in such a definite manner.

In any case it is difficult to see how psycho-analysts can refrain from putting forward a reasoned defence of their position without giving that position entirely away. I do not know whether they have ever published any statistics to prove that those who regularly attend confessional are less liable to those neuroses which they attribute to repression. Should they have done so or be able to do so it might go some way towards supporting their position.—I am, etc.,

Harrogate, Oct. 8th. P. MCBRIDE.

UNSUSPECTED PREGNANCY.

SIR,—In view of Dr. Graham Grant's sweeping assertion that no "woman of average size with uterine contents of average bulk" can go to full time without suspecting her condition I beg to record the following case.

On October 25th last year I was called to see a patient on account of a "swelling in the stomach," which was suspected to be a tumour. I found the patient to be a primipara, aged 33, of normal stature, but rather on the small side. She had been married two years, and was living a happy normal married life with her husband. I found her on examination to be nine months pregnant, and when I informed her of her condition she received the news with incredulity, and it was not until two days later when she was delivered of a healthy 7 lb. child that she would accept my diagnosis as correct.

It is interesting to see how the signs of pregnancy were satisfactorily accounted for without arousing suspicions as to her condition in the mind of the patient or her husband. This is even more remarkable when one takes into consideration the fact that she is a woman of normal mentality, who left school on reaching standard five, which I am led to believe indicates an average degree of intelligence.

1. The cessation of menstruation was easily explained to her own satisfaction, as she had always been irregular, due she believed to anaemia.
2. The vomiting of pregnancy was slight, and was similarly easily accounted for as she was of a "bilious nature," and subject to vomiting and feelings of nausea on the least provocation.
3. Foetal movement was felt, but passed unrecognized, the symptoms being attributed to "wind" for the treatment of which she resorted to aperients. When these failed to stop the "rumblings" the husband cleverly dealt with the situation by administering brandy, which the patient assured me never failed to give immediate temporary relief.
4. A great improvement in appetite was held responsible for the increase in girth and general dimensions, until a few days before labour, when a tumour was suspected. I am indebted to this last most alarming suspicion for my professional attendance on what has proved to be a most interesting case. The husband noticed the increasing proportions of the abdomen and breasts, but never gave pregnancy a thought. However, to explain it he went one step further in the misdiagnosis, and attributed the increase of appetite of his wife to the invigorating air of the district, to which they had recently come to live.

The patient had no reason to hide her pregnancy; in fact, both she and her husband were delighted at the discovery, though somewhat nonplussed by the difficulty of providing baby necessities and a nurse at so short a notice.

Strange as all this may read, I would remind the "doubting Thomases" that sometimes, and especially in this particular case, facts are more strange than fiction.—I am, etc.,

R. W. HODGSON-JONES, M.R.C.S., L.R.C.P.

Caterham-on-Hill, Surrey, Oct. 8th.

SIR,—The case I reported (September 23rd, p. 578) happened in the last years of the war. The patient's husband was in France, and she lived with her mother, who washed her linen for her, and by so doing was able to note the regularity of her daughter's periods. The patient was a fine, well-modelled woman of average height, such as one might infer of anyone engaged in her employment. The baby and placenta were of average size. There was no reason to question the *bona fides* of the patient, her mother, or the representative of the firm for whom she was working. If the patient was lying to me and had been conscious of her condition it is all the more surprising that she should engage herself as a mannequin.

In view of the facts of the case as observed by or reported to me it would be more judicious if Dr. Graham Grant did hesitate before asserting that a woman cannot go to full time without suspecting her condition.—I am, etc.,

Manchester, Oct. 9th. ALFRED WILLIAMS, M.D.

SIR,—Will you kindly allow me a little space to answer Dr. Graham Grant (p. 651), especially as the question of unsuspected pregnancy came up in a recent *cause célèbre.*

The answer to (*a*) has been fully given; (*b*) the woman was slim. The answer to (*c*) was given also.

The woman was living with her husband, who summoned me.—I am, etc.,

London, S.W., Oct. 6th. J. FLETCHER.

THE THYROID GLAND AND DISEASED TONSILS.

SIR,—In reply to the letter of "M.A., M.D." (October 7th, p. 662), I regret the ambiguity to which he has drawn attention. What I meant to say was that the removal of a focus of septic absorption such as diseased tonsils must be thought of in relation to possible structural damage already inflicted upon the endocrine system, and, as such, irremediable. I did not intend to suggest that the removal of tonsils *qua* tonsils had any known relation to endocrine function.—I am, etc,

London, W.1, Oct. 7th. H. CRICHTON MILLER.

Obituary.

ARMAND BERNARD, B.A., M.B.DUBL., L.R.C.S.EDIN.,

Consulting Surgeon, the Lock Department, Royal Infirmary, Liverpool.

THE death of Dr. Armand Bernard has come as a surprise to many of his friends in Liverpool. At the end of the war Dr. Bernard retired from active practice in the specialty with which he had so long been identified. He however continued in his work as a member of the Birmingham War Pensions Committee. Towards the end of last year his health began to fail, and after a lingering illness he passed away at Millom in Cumberland, on October 4th, at the house of his son-in-law, Dr. John Pratt, D.S.C.

Dr. Bernard studied medicine at the University of Dublin, and graduated B.A., M.B. in 1870. In the following year he

took the L.R.C.S. and L.M.Edin., and shortly afterwards settled in Liverpool, where he devoted special attention to venereal diseases among the sailors of the port. His assiduity earned for him the appointment of honorary surgeon to the Lock Hospital under the Royal Infirmary. From that time he became well known as a specialist in venereal diseases, and published many papers in the *Liverpool Medico-Chirurgical Journal*, of which "Mediate syphilitic infection in glassblowers" (1884) was one of the most interesting. Many of his old students will recall to mind the clinics he used to hold regularly, and the pains he took in imparting knowledge and in demonstrating cases. Dr. Bernard was naturally a quiet man, and rather shrank from any form of publicity; essentially a clinician, his opinion was frequently sought in cases of difficult diagnosis before the era of serological tests. To his intimate friends he was a genial man, and had the charm of keeping them.

The funeral, which took place on October 8th in Liverpool, was attended by many old friends and neighbours. Dr. Bernard was a widower, and leaves a son, Captain Cyril A. Bernard, M.C., R.A.M.C., and three married daughters.

We regret to record the death of Dr. T. D. Luke of Clevedon, Somerset, which took place on September 25th after an acute and brief illness. Thomas Davey Luke was born in 1873 at Scorrier in Cornwall, and went from Truro School to Queen's College, Belfast, graduating M.B. of the Royal University of Ireland in 1894 and M.D. in 1908. He obtained the Fellowship of the Royal College of Surgeons of Edinburgh in 1902. While a student at Belfast he won a scholarship in medicine at Queen's College, and the Malcolm and Coulter exhibitions at the Royal Victoria Hospital. For several years he enjoyed an extensive practice in anaesthetics in Edinburgh, and was lecturer in that subject at the University of Edinburgh and the first anaesthetist to the Edinburgh Royal Infirmary. But his health, which was never of the best, compelled him to relinquish these posts, and he became medical superintendent of the Peebles Hydro, for which previous experience at Matlock and Grange-over-Sands had fitted him. Dr. Luke wrote two small works on practical anaesthetics, which each passed through several editions, and he was known also for his writings on hydrotherapy and kindred subjects. During the war he served as surgeon lieutenant-commander in the R.N.V.R. Two years ago (writes a colleague) pursuit of health again led him to the sunnier south, and he took up practice in Clevedon, where he won immediate and general respect by his genial and kindly disposition, his readiness to promote the welfare of the town, and his untiring work of self-sacrifice. He had an extensive knowledge of therapeutics, and had contributed to some of the leading works on treatment, his latest book on physiotherapy being published this year. Dr. Luke leaves a widow and three young children, to whom deep sympathy is extended in their tragic loss.

Universities and Colleges.

UNIVERSITY OF GLASGOW.

The following candidates have been approved at the examination indicated:

Final M.B., Ch.B.—A. W. Aird, Margaret Alexander, R. G. M. Alexander, Isabel P. Allan, A. Anderson, A. Anderson, W. C. Andrew, Margaret R. Balloch, A. L. Bernstein, Catherine Alexandra, Samuella Blair, Mary MacQ. Bonnyman, Catherine Boyd, Mary Dickeson, A. Boyd, F. A. Brown, R. O. Bruce, Barbara A. Cameron, Janet R. Campbell, Margaret F. Campbell, Margaret G. Carrick, Norah T. Cassidy, Gladys M. Chapell, H. Collingbourne, Margaret E. Colville, Elizabeth S. Cook, J. Cook, J. S. Cook, R. Crawford, Gerhardus C. Cruijwagen, J. S. Currie, Isabella C. Darling, Agnes C. J. Davidson, Margaret Davidson, T. W. David on, J. Dawson, Isabelle A. Deans, Agnes F. Dickson, Lillian M. Dickson, J. S. Donaldson, A. F. Dunn, Amy M. Fleming, Elizabeth H. Forrest, A. Fyfe, A. Gardiner, R. C. Garry, A. V. Garscadden, Emmie C. Gibb, T. Gibson, Jean M. Gilchrist, Margaret B. Graham, J. Grant, R. A. Grant, W. N. Gray, H. G. Halliday, J. W. Hamilton, R. C. Hamilton, Catherine Harrower, A. T. Hastie, Mary N. Hendry, W. D. Hood, T. W. Howie, G. J. Hutchison, Elizabeth G. Jamieson, Jessie M. C. Jamieson, Mary K. Jeffrey, T. J. Jones, F. C. Laing, J. E. S. Lee, A. Leitch, J. Lindsay, G. W. Lochhead, Isabella Lumsden, W. W. Luncie, H. M'Cluskey, Joan A. P. MacColl, J. W. M'Conville, Mary P. MacCunn, A. A. Macdonald, Chrissiebella Macdonald, T. J. M'Kail, K. W. Mackenzie, Marion A. M'Kenzie G. MacKerracher, M. M'Lean, N. A. MacLean, S. M'Mahon, R. C. MacMurray, A. M'Nulty, Marion L. M'Quaker, Mary M'Quaker, Doris M'Walter, Agnes L. Mair, D. C. Marshall, D. V. Marshall, H. R. Melville, Elizabeth W. Miller, J. H. Miller, A. Mitchell, W. T. Mitchell, W. Morison, D. R. MacP. Morrison, Ellen D. Morton, W. Muir, G. J. Muller, J. P. Neilson, Sarah H. Nelson, Elizabeth K. Nicholson, J. Nicholson, T. Nicol, J. L. Orr, J. A. R. Oswald, M. G. Pezaro, Louise B. Pollock, T. C. Porter, Mary E. Proudlove, T. D. Pyle, J. H. Ramage, J. S. Ramage, Elizabeth C. Rodger, Bessie S. Ross, Mrs. Sarah Ross, J. Russell, Bertha E. A. Sharpe, W. Simpson, Christina R. I. Sloan, A. Snaddon, J. Sommerville, J. F. M. Stenhouse, Effie S. Stephen, Mary MacP. Stevenson, Jeanie M. Strathie, T. Tannahill, H. G. B. Teggart, R. W. Todd, Margaret S. Watt, Jemina Waugh, Janet A. O. Weir, A. F. Whyte, Catherine B. Wilson, J. H. Wilson, J. W. Wilson, J. H. Wright, Grace M. Young, J. A. K. Young.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW.

The following have been admitted to the Fellowship (after examination): J. A. G. Burton, J. Reid.

Medical News.

A new winter course of scientific demonstrations arranged by the North of England Branch of the British Medical Association will begin on Thursday, October 19th, at 2.30 p.m., at the Durham County Hospital, when Mr. Hamilton Drummond will deal with treatment of diseases of the colon, Dr. E. Farquhar Murray with border-line gynaecology, and Dr. F. J. Nattrass with meningitis. Tea will be served at 4 o'clock, after which an hour will be devoted to the demonstration of cases by the honorary staff of the Durham County Hospital. The second meeting takes place at the Royal Victoria Infirmary, Newcastle-upon-Tyne, on November 16th.

The opening lecture of the winter session of the Central London Throat, Nose and Ear Hospital, Gray's Inn Road, will be given by Mr. Chichele Nourse, F.R.C.S.E., at 4 p.m., on Thursday, October 26th. The subject is "Foundations of otology: the work of Flourens."

Mr. Philip Franklin will deliver a post-graduate lecture for the Fellowship of Medicine, at 1, Wimpole Street, W., on Tuesday next at 5 p.m., when he will deal with the clinical aspects of tonsils and adenoids. On Wednesday, October 25th, Dr. Eric Pritchard will speak at 8.30 p.m. on the feeding of infants from birth to the end of the second year, and on Tuesday, October 31st, Dr. C. E. Lakin will give a lecture at 5 p.m. on indigestion. Other lectures have been arranged for delivery during November and December.

A course of nine lectures on maternity, child welfare, and school hygiene will be delivered at the Royal Institute of Public Health, 37, Russell Square, W.C., on Wednesdays, at 4 p.m., commencing on October 18th, when Professor Louise McIlroy will speak on the influence of ante-natal care upon infant mortality. No tickets of admission are required.

Dr. R. W. Wilson, having completed forty years in the Poor Law service, has recently resigned. He was appointed medical superintendent of the Croydon Union Infirmary when that institution was opened in 1885. As a mark of appreciation of his thirty-seven years' service in that capacity and also as medical officer of the union home and children's homes, the Croydon Board of Guardians presented him with a handsome silver rose-bowl and leather album containing an illuminated address and the signatures of the contributors. The staff of the Croydon Union presented him with a magnificent chiming clock inscribed with a record of his services. Dr. Wilson was also the recipient of a china tea-service and oak tea-tray from the patients of the infirmary, a breakfast-cruet from the "grannies" of the infirm ward of the union home, and a stamp-album from the children in the homes.

The first meeting of the forty-first session of the West London Medico-Chirurgical Society was held at the West London Hospital on October 6th. Sir Lenthal Cheatle, the retiring president, inducted his successor, Dr. A. G. Wells, who then presented him with the Keetley medal in memory of his year of office. The new President then delivered the opening sessional address, taking as his subject the changes which he as a general practitioner had noticed during the last forty-two years.

At a meeting of the University of London Labour Party held at the Essex Hall, Strand, on October 6th, Mr. H. G. Wells was adopted as the prospective candidate of the party at the next general election.

The Medical Prayer Union will hold a conversazione for the reorganization of the Union, at the rooms of the Medical Society of London, 11, Chandos Street, W.1, on Thursday, October 26th, 1922, at 8 p.m., when an address will be given by Dr. Burnett Rae, on "The religious implications of psycho-therapy." Intimation of intention to attend would be appreciated by the Honorary Secretary, *pro tem.*, Dr. Tom Jays, Livingstone College, E.10.

The Wellcome Physiological Research Laboratories, formerly at Herne Hill, have been removed to Langley Court, Beckenham, Kent.

THE first dinner meeting of the Hunterian Society will be held at Simpson's Restaurant, Cheapside, on October 16th, at 7.30 p.m. The dinner will be followed by the presidential address on "The breakdowns of middle life," by Dr. Fortescue Fox; and a paper by Dr. Ernest Young on the treatment of dyspepsia in necessitous patients.

AT the September matriculation examination of the University of London there were 67 successful candidates in the first division and 503 in the second division, while 39 gained the supplementary certificate in Latin, three in mathematics, and one in heat, light, and sound.

FOUNDERS' day will be celebrated at the National Hospital for the Paralysed and Epileptic, Queen Square, W.C., on Wednesday, November 1st, from 3 to 6 p.m. Each visitor is asked to regard this also as a "pound day" and to bring a pound of goods or money for the hospital.

THE National Health Society, of 53, Berners Street, W.1. has arranged for a comprehensive six months' course of training for fully trained nurses and others with certain previous qualifications, who wish to obtain appointments as health visitors and infant welfare workers. The Board of Education has drawn up a definite curriculum for such students, the full course for untrained and younger women being of two years' duration. The fee for a six months' course is 12 guineas, and the new session commenced at the end of September, but students can join later; full particulars can be obtained from the secretary of the Society.

THE Italian Society of Urology will hold a congress at Florence on October 24th, when the principal subject for discussion will be the remote results of prostatectomy, introduced by Professors Gardini and Lasio.

THE Swedish Society of Physicians has decided to bestow the Anders Reizius medal on Sir Charles Sherrington, G.B.E., M.D., President of the Royal Society, and Waynflete Professor of Physiology in the University of Oxford, for his researches in physiology of the nervous system.

THE nineteenth Italian Congress of Surgery will be held at Florence from October 21st to 25th, when the following subjects will be discussed: (1) duodenal ulcer, introduced by Professor Alessandri; (2) arterial and arterio-venous aneurysms, introduced by Professors De Gaetano and Zabelloni.

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London*; telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London*; telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Medisecra, Westrand, London*; telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh*; telephone, 4361, Central).

QUERIES AND ANSWERS.

INCOME TAX.

"G. E." is buying a practice and the premium is payable partly cash down, partly by instalments.

*** (1) No allowance can be claimed for that portion of the total capital sum represented by the instalments, neither can tax be deducted therefrom. (2) Interest paid to the bank on an overdraft obtained for the purchase of the practice can be treated as a professional expense.

"J. O'L. M." is assessed for 1921–22 on the amount of his salary as assistant for that year.

*** He was serving in the Canadian forces for 1919. Under an arrangement or concession made by the Board of Inland Revenue army service may be reckoned as "employment" for the purpose of taking an average for the assessment of the earnings of subsequent employment, consequently "J. O'L. M." is chargeable for 1921–22 on his average earnings for the three previous years, or for as long as his army service and civilian employment lasted if a less period.

"C. G." is an assistant who receives a fixed salary, and whose rent has been paid for him by his employer to the landlord.

*** Assuming that "C. G." has the full rights obtainable by payment of the rent he is the statutory occupier, and the amount of rent paid by his employer is assessable on "C. G.," and, of course, properly regarded as an expense of the practice in the same way as the salary.

ASTHMA.

DR. ALEXANDER FRANCIS (London) writes: I think that Dr. Martin (September 23rd, p. 582) would find that a cachet containing caffein valerian. gr. 2, theobrom. sodiosalicyl. gr. 5, would help his case of polypus asthma and prevent the necessity of so much adrenaline. One of these cachets can be taken every three or four hours if necessary. Asthma, when associated with nasal polypi, is very difficult to deal with, and the removal of the polypi usually increases the difficulty. The more complete and perfect the operation from a nasal point of view, the more intractable and desperate is the asthma likely to become. It is not sufficiently well known that asthmatic subjects with a low blood pressure, who have, or have had, nasal polypi must not be given aspirin, antipyrin, or oxyquinothein. These remedies in such cases are not only useless, but positively dangerous.

LETTERS, NOTES, ETC.

URINE TESTS.

DR. W. ADAMS CLARK (Penge) writes, in reply to Dr. Washington Isaac's query (September 30th) under this heading: I suggest the use of Benedict's test instead of Fehling's as the best test for routine examination of the urine for sugar. No difficulty occurs with the stopper of the one bottle required. The solution can be obtained ready for use. It keeps well, and is inexpensive. Benedict's test for sugar is made up as follows: Sodium citrate 173 grams, dry sodium carbonate 90 grams, are dissolved in hot water and filtered. In this solution 100 c.cm. of a copper sulphate solution containing 18 grams of the salt are added, with constant stirring, and the whole blue-coloured solution is made up to 1 litre with distilled water. To carry out the test about 1 inch of the solution is placed in an ordinary-sized test tube, and 8 drops —not more—of the urine added. The mixture is then thoroughly boiled, and the appearance of a spontaneous precipitate which may be green, yellow, or red according to the amount of sugar present in the urine, indicates a positive reaction for sugar. If no sugar is present the solution remains blue, or shows only a faint greenish-blue haze. The reagent is not affected by the reducing substances in the urine other than sugar, and the reaction being only slightly alkaline, there is less danger of destroying small amounts of sugar which may be present. The test can be applied in artificial light, since it is the bulk of the precipitate and not so much the colour which gives positive indications of sugar.

PREVENTION OF VENEREAL DISEASE.

"G." writes: The letter by Mr. Herbert Caiger on "The radical prevention of venereal disease" in the issue of October 7th (p. 661) certainly raises very vital questions. Has the writer considered to what his remedy—"a universally applied habit of unselfish thinking, practised every day in every way"—(not only in sex matters) would lead? Could he who loves his neighbour allow him to work for him at wages incompatible with a decent life? Could shareholders continue to draw interest until the original capital had been refunded many times over, interest which has to be produced by the workers before the rate of wages which the industry can afford to pay is calculated? Can his principle be carried out without changing the whole structure of society?

CORRECTION.

DR. DOUGLAS K. ADAMS calls attention to a clerical error in his paper on neuro-syphilis, published last week. In the description of a case of transient diplopia (p. 632, col. 1, line 22) the words "right external rectus" should read "right internal rectus."

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 34, 35, 38, 39, 40, and 41 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 36 and 37.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *143*.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£ s. d.
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An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.